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INTEGRATING THEORY, PRACTICE AND POLICY: THE TECHNICAL EFFICIENCY AND PRODUCTIVITY OF FLORIDA'S CIRCUIT COURTS

by

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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Public Affairs
in the College of Health and Public Affairs
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ABSTRACT

In 1998, Florida voters approved Article V, Revision 7, which changed the funding mechanism of the state circuit court system from a county/state mix to state responsibility. The change was implemented as planned in the 2004/05 fiscal year. Although increased efficiency was a key goal of Revision 7, to date no published studies exist on the impacts of Revision 7 on circuit or system efficiency and/or productivity. This work analyzes Revision 7, integrating the larger debate of increasing judgeships or improving efficiency. The study is a full performance analysis of the Florida circuit courts from 1993 through 2008 that can benchmark the system's future efficiency and productivity. In that respect, top performers are identified.

The study follows the evolution of court studies from their rational origins to the more recent orientation of open-natural systems. Resource dependency and institutional theory, two open-natural system frameworks, are utilized to predict that Florida's circuit courts have become more efficient over the period since the implementation of Revision 7. The efficiency outcomes are expected to be unequal across circuit sizes. Integrating a Florida debate to a larger one that transcends time and culture, productivity changes are expected to be a function of the number of judges that a circuit adds within a given year, controlling for other factors.

The results of the study methodologies—data envelopment analysis, Malmquist Productivity Index, hierarchal regression analysis and analysis of covariance—reveal that only 3 of 300 DMU's in Florida are technically efficient; the mean IOTA score is .76. The Florida circuits did not improve efficiency and productivity as expected, in fact becoming significantly less efficient over time as a function of Revision 7. Small and medium-sized circuits lost efficiency, large circuits showed no change and there was a significant interaction between circuit size and Revision 7 period. Within the system overall, productivity fell by 2.7%, most noticeably in the small and medium-sized circuits. The number of judges a circuit added explained 32.2% of the variance in total factor productivity change. The largest system productivity losses followed both Revision 7 intervention years and the addition of the most judges in a single year. Analysis of covariance revealed that productivity increased only when no judges were added to a circuit, regardless of circuit size or time period (+2.6%). The addition of a single judge reduced average productivity by 8.6%; adding two judges reduced productivity by 10.5% and adding 3 or more judges reduced productivity by 16.2%. As judges were added, productivity declined in circuits of all sizes, but the drop was more pronounced in the small and medium-sized circuits. None of the circuits showed an increase in productivity from 1993 to 2008.

Revision 7 has not increased circuit court efficiency or productivity in Florida. It is recommended that efficiency and productivity analyses be included in resource allocation decisions such as adding judgeships. More data on court structures and process are needed. Efficiency and productivity measures show that the current level of circuit court judgeships is sufficient.

This dissertation is dedicated to my wife Bobbi Ferrandino and our wonderful son Joseph Truman, both of whom sacrificed more than anyone could have asked to help me make this achievement possible. Also, to my late grandmother Angelina who will always be in my heart.

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Though I would like to acknowledge the entire faculty that I studied under in the Public Affairs Program, two faculty members in particular require my direct acknowledgement: Dr. Jackie Zhang, for graciously serving on my committee and for setting a benchmark of dedication and hard work relative to the practice and art of research; and Dr. Larry Martin, in whose class my entire education coalesced and new avenues of inquiry and interest were born. I would also like to acknowledge Dr. Robert H. Wood for his thoughtful comments and contributions.

Finally, I must acknowledge my high caliber classmates that pushed me to excel in my studies and taught me about other disciplines, perspectives and worldviews.

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DEA: Data Envelopment Analysis.

DMU: Decision making unit in data envelopment analysis.

IOTA: Efficiency score from data envelopment analysis.

MPI: Malmquist Productivity Index.

NCSC: National Center for State Courts.

TFPCH: Total Factor Productivity Change, or the change in productivity over a specified time.

CHAPTER ONE: INTRODUCTION

> No nation can function well without a good judicial system. It is an integral part of good governance. It is a necessary part. So whatever system you have of governance, you need a strong, valid, capable judicial system to make it work. My experience comes out of a democratic system where we have a Constitution; the nation's basic law adopted with the consent of the people, and that provides certain guarantees to the citizens of that country. How do you make those guarantees a reality? You can't do it without a good judicial system.
>
> -Sandra Day O'Connor (2003)

The Current State of Florida's Circuit Courts

The ideals and importance of a "good judicial system" (O'Connor, 2003) have run headlong into the realities of state budget economics and politics. The national economic downturn over the past several years has had a great impact on state courts, especially in Florida where "the court budget is one of the worst in the nation" (Stawicki, 2008, n.p.). To complicate matters, a policy change (hereafter referred to as Revision 7) was implemented in the 2004-2005 fiscal year that changed the mechanism of circuit court funding from a local/state mix to state funding control. This change was voted into law in 1998 by the citizens of Florida (Florida State Constitution, Article V, Revision 7, 1998 as cited by: Florida Supreme Court, 2000; Baskin, 2004; Carlson, Harrison and Hudzik, 2008). Prior to this change, circuit court funding in Florida had been the joint responsibility of the state and counties (Tobin and Pankey, Jr., 1994).

Revision 7 was a five-part amendment that voters had one vote on. The first part asked residents whether or not they wanted to retain their vote on circuit court judgeships (YES) or have the governor appoint judges and the voters the power to retain them in office (NO), similar to the Supreme Court selection process in Florida. The second part asked voters about judicial election procedure; the third about county judge term length; the fourth about term limits for judicial qualification committee members and the fifth part about their desire to switch to a state funded court system (YES) or to keep the current funding structure (NO). Overall, the amendment passed statewide 57-43%. Using data available from the Florida Department of State, Division of Election (n.d.), 15 of 20 circuits approved Revision 7 (53% in small circuits, 54% in medium-sized circuits and 58% in large circuits). At the county level, 37 of 67 counties voted for Revision 7 with at least 51% in favor. However, due to the structure of this amendment, it is not possible through this information to determine if the support was for the entire amendment or its individual parts. Focusing only on the fifth and final part, hereafter there are three specific time categories of Revision 7 this work analyzes: 1993/94-1997/98 (pre-enactment of Revision7); 1998/99-2003/04 (post-enactment but pre-implementation); and 2004/05-2007/08 (post-implementation).

Carlson et al. (2008), in a thorough quantitative report, found that Revision 7 had created greater resource equity throughout the Florida circuit court system and had enhanced accountability, but that because neither the stability nor the amount of funding was adequate, the results of Revision 7 were mixed. The report noted that the initial policy adoption of Revision 7 presumed that circuit court efficiencies would "be achieved later through identification and implementation of improved business practices" (p. 67). In fact, due to the complexities of the policy change, the efficiency of the court in relation to staffing levels was not thoroughly considered before the policy took effect (p. 68). Furthermore, the system designed to collect data and test the efficiency of the courts' state funded elements, the Resource Management System, had not been funded by the state at the time the policy was enacted (p. 69). Tobin and Pankey, Jr. (1994) noted that the revitalized push for unitary state-funded court systems resulted from a resource scarcity that they predicted would last for the foreseeable future, making court efficiency a dominant aim of such a policy change. Yet, Hudzik (1990) had shown that in three states that had already switched to state funding, survey respondents saw little change in efficiency, though expecting that to "change over the long run" (p. 11). The fact remains that court efficiency, an important goal of unitary state funding, had not been fully researched before the policy was enacted and implemented.

Florida has an established formula that allocates annual funding to each trial court unit using a functional rationale by which weighted statistical workload data compensates for circuit court size (Carlson et al., 2008). The weighted caseload approach to assessing court staffing needs analyzes the types of cases that comprise a court's work over a given time period and multiplies these by the length of time in minutes that each type of case requires, thus creating a case weight. Theoretically, judicial need can be established based on the weighted caseloads by seeing how many judges there were and how many would be needed the next year to handle the predicted amount workload (Ostrom, Ostrom, Hall, Hewitt and Fautsko, 2000). Flango and Ostrom (1996) explain weighted caseloads, positing that weighting cases based on their time is superior to using raw case counts but has several problems as well, including: the trouble of data collection, the problem of current data rather than from the past and the notion that case weights may enshrine inefficiency. New Jersey had doubts about this approach over two decades ago (see

Carlson et al., 2008). Despite these shortcomings, the weighted caseload approach has been further endorsed by the National Center for State Courts (NCSC) as "the *best* method for measuring case complexity and determining the need for judges" (original emphasis, Ostrom et al., 2000, p.6).

Since the budget process is completed *before* the needs of the court are known for the following year, the resource allocation to each court is always prospective. The fact that resources are often allocated without regard to the volume and complexity of a court's work is a problem the courts grapple with (Heydebrand, 1977), especially when annual volume outpaces the allocation *after* it has been decided on. This anomaly is especially troubling now since from 2006 to 2008 the Florida circuit courts have had a 399% increase in foreclosure filings (Florida State Supreme Court, 2009). Several news sources place the 2010-11 budget deficit in Florida at around $3 billion or so (see Dunkelberger, 2010; Kam, n.d.) and the judicial salary in Florida circuit courts, not counting benefits and other associated costs, is 14th highest in the nation at $142,178 (Survey of Judicial Salaries, 2009). Furthermore, 84.5% of the state court budget is allocated to trial courts (Florida State Courts Annual Report, 2008-09). Clearly, an efficiency analysis of efficiency and productivity in the state's circuit court system is highly pertinent.

A recent report on the nation's largest state court system highlights the issue: "California is the leader in the national effort to answer a question of vital public policy importance: How efficiently and effectively do courts use their budget and human resources in delivering service to the public?" (Ostrom et al., 2007, p. 2). This dissertation can provide badly needed empirical information and lead public policy analysis on resource allocation and funding changes for the circuit court system in Florida. To address this policy issue from an interdisciplinary perspective that incorporates the fields of policy analysis and public administration, the research questions are structured around Revision 7 and the current court situation in Florida to examine these questions:

1. How efficient overall have Florida's circuit courts been in response to the implementation of Revision 7, controlling for other factors?
2. Does circuit size affect efficiency outcomes related to Revision 7?
3. How does adding judges to a circuit affect court productivity?
4. What circuit(s) perform(s) best in terms of efficiency and productivity overall?

Study Problem

The debate on court resource allocation has been mostly anecdotal and rhetorical; scant empirical research exists on the relationship between the allocation of financial resources to the judiciary system and its subsequent performance (Carlson et al., 2008; Hartley and Douglas, 2003). Lost in the debate over control of court funding has been attention to a basic element of public organization performance that is especially pertinent in tumultuous economic times: technical efficiency, which is the use of inputs to achieve certain levels of output. Among the many public organizations under pressure to become more efficient (Rainey, 2003; Nyhan, 2002; Butler and Johnson, 1997) are court administration and operations in the United States (Flango and Ostrom, 1996; Lewin, Morey & Cook, 1982) as well as in Europe (see Ng, Velicogna and Dallara, 2006). Court efficiency studies—especially ones examining a specific policy like Revision 7 while accounting for other factors—do not appear often in the published literature even though there is pressure on courts to be more efficient. Despite the importance of efficiency and the possible effects of Revision 7 on the circuit courts, evidence is lacking from which to draw conclusions about the Florida circuit court system either in sum or with respect to its parts.

From the perspective of Florida's judicial stakeholders, the courts need more resources for judicial personnel even as the state is pushing for more efficiency. The financial situation in Florida has greatly constrained the budgets of all organizations relying on public funding. The judicial branch in particular has two distinct strategic choices in such economic downturns, as posited by Cohen and Eimicke (1998): the courts can be resistant to change and act defensively or they can "embrace change as a survival strategy, recognizing that their best defense in a cutback environment is enhanced productivity" (p. 10). The problem for Florida's circuit courts is to prove, quantitatively and with a rigorous scientific methodology, that they are highly efficient and productive in order to justify the request for additional judges. Strategic organizational change is called for, but the adage holds true: that which cannot be measured cannot be managed.

The courts, for a variety of debatable reasons, no longer have *prima facie* resource legitimacy as a social institution, but rather find themselves competing for resources with other public sector organizations (Buenger, 2004; Lewin, Morey and Cook, 1982). This challenge is particularly problematic for the courts, since as Parsons (1956) noted, the two conditions for generating power within an organization are: (1) the level of institutional legitimacy in decision making and (2) "the command of necessary facilities, which in our society is primarily financial" (p. 226-27); under Revision 7 the courts lack both conditions. This dissertation may either shed light on how the courts prove to have high technical efficiency and productivity, thus enhancing the legitimacy of the judicial resource request, or expose inefficient circuits so that the court system's decision makers can increase productivity in order to survive in the downturn. Moreover, identifying the circuits that are the best performers can create empirical benchmarks for measurement.

In 2004 the Florida court system itself noted the importance of this challenge: "[A]s state resources are deployed in the trial courts, the ability of the branch to demonstrate operational efficiency and effectiveness in the use of those funds will be critical to its ongoing ability to secure adequate funding and management flexibility" (Florida State Court Annual Report, 2003-04, p. 10). This is what has not been done.

Study Purposes

This study empirically examines circuit court technical efficiency within a systems framework over time for the following three purposes: 1) to inform and maximize circuit court funding decisions under Revision 7 by establishing a supplemental methodology the courts can use to request and/or analyze resources; 2) to establish circuit courts as institutional organizations that are expected to be efficiently run, responsive and open systems; 3) to contribute to the policy debate about either increasing judicial resources or increasing the efficiency and productivity of the existing resources. The first purpose is consistent with the main reasons to assess court performance as posited by the NCSC in the context of an understudied policy that strongly affects the Florida judicial system. The second purpose advances the theoretical study of courts as organizations that interact with their environments in a resource-dependent relationship responding similarly to other institutional organizations in the same situation. The third purpose adds to the sparse literature on court policy by empirically examining a policy debate that transcends borders and cultures. A further, major overall purpose of this study is to assist in the transition of court research from historical standards of a qualitative nature to those of a quantitative nature that "will point to courts that, based on current practices, appear in need of more (or fewer) judges or court support staff, at which point a qualitative analysis is necessary to confirm the need" (Flango and Ostrom, 1996, p. 95). The weighted caseload framework used in Florida provides one method of accomplishing that goal. One purpose of this dissertation is to provide another method, thus enhancing the overall process.

The NCSC has been at the forefront of developing court performance measures and measures of judicial need, publishing several reports on these subjects from varying perspectives and methodologies (Uekert, et al., 2006; Ostrom et al., 2005; Ostrom et al., 2000; Ostrom and Hanson, 1999; Tobin, 1996; Flango and Ostrom, 1996; Church, 1978 as examples). This study, by systematically analyzing the courts' performance in technical efficiency and productivity, has the potential to contribute to court systems throughout the nation as well as specifically to the State of Florida's judicial branch by providing evidence to guide the improvement of efficiency, a key policy goal of Revision 7. The Florida judiciary, in their 2009-2015 Long Range Strategic Plan (2009, p. 9), states the same goal, calling for "more objective research into policy outcomes" within the context of the reality that "*in an era of limited resources it is critical that the Florida judicial system develop and implement operating policies that utilize public resources, including the resources of justice system partners, effectively, efficiently, and in an accountable manner"* [original emphasis].

The first specific study purpose is to inform policy makers that allocate resources to the Florida courts of their comparable technical efficiency before, during and after Revision 7 was enacted in 1998/99 and implemented in the 2004/05 fiscal year. This comparison will show whether or not the courts have become more efficient and productive over time and also has the potential to remind the courts, as the NCSC (2005a) states, that one purpose for "embracing court performance measurement is that perceptions and beliefs of court insiders about how work is getting done are not always accurate. In contrast to endless debate, performance data allows everyone to test the reality of their assumptions of how well things are going" (p. 2). Both internal court stakeholders and state policy makers could use this objective evidence presented here to support, refute or adjust their policy positions regarding the resources allocated to the courts under the policy of Revision 7. This purpose is also consistent with Strategy 2.2(b) of the Florida Judiciary 2009-2015 Long Range Strategic Plan (2009), which states that the courts must "continue to develop and institutionalize performance and accountability management systems that implement best practices in resource management" (p. 11).

The aims of this study parallel Lewin, Morey and Cook (1982) in their examination of the North Carolina criminal court system, the study of Norwegian district courts (Kittelson and Forsund, 1992), Nyhan's (2002) evaluation of Florida's juvenile halfway houses and an analysis of the technical efficiency of prison systems in Michigan (Butler and Johnson, 1997). It is also consistent with the view of the NCSC (2005a) that:

> The value of performance data for preparing, justifying and presenting budgetary requests should make performance assessment a standard management practice. This is a critical foundation for building evidence-based requests for new initiatives and additional resources. Furthermore, this

> approach shields the courts from criticism that budget requests are the product of judicial preference rather than established need. (p. 2)

This study conducts an objective analysis of the efficiency and productivity of Florida's courts over time, both within and between circuits, to inform stakeholders on all sides of the debate about how well the current resources are being used by quantitatively determining whether circuits are maximizing their productivity and efficiency. If productivity and efficiency are now maximized, the request for more judicial resources is more valid. Furthermore, the empirical results of this study can be utilized by the Florida courts to benchmark future performance and set goals for each court and the court system.

The second purpose of the study is to examine courts as institutional public organizations focused on efficiency. This aim is especially pertinent to the NCSC's (2005a) acknowledgement that "since courts use public taxpayer resources, elected representatives are legitimately entitled to raise questions about efficiency and effectiveness in the expenditure of court funds" (p. 3). As such analysis was not conducted before Revision 7 was placed on the ballot or implemented, it is necessary to do it now. The Florida circuits are comprised of felony criminal, family and civil courts but research from that holistic perspective is relatively sparse. This work adds to the literature on courts, informing policy and building a fuller model of their technical efficiency that could enhance resource accountability and its measurement. Mears (2007) notes that within the field of criminal justice "[among] the national demands for greater government accountability has been the increased emphasis on efficiency; that is, showing that resources are expended in the most productive manner possible" (p. 677), a requirement directed also to such institutions as schools and police departments. The present work examines the history of court efficiency studies from their rational foundation to the current perspective of open-natural systems, bringing court systems into the same arena with other public organizational systems in terms of demonstrating efficiency and productivity.

The third purpose of the study is to contribute empirical data to the debate over adding judgeships versus increasing efficiency. This third purpose integrates the NCSC goals for measurement of court performance with the theory that courts can increase productivity and/or efficiency by adding judges (Heydebrand, 1977), a debate current not only in Florida but in other judiciaries throughout the world. To that end, the study examines two separate but integrated policies— the impact of Revision 7 on Florida circuit court efficiency and the effect of adding judgeships on efficiency and productivity—within a theoretically informed framework.

Thus this study: 1) advances the study of courts' response to direct public policy interventions, in this case Revision 7, within the context of environmental and system influences that are hypothesized to affect court efficiency; 2) informs court policy and practices; 3) enhances the movement for court performance measurement, creating a body of objective evidence of the technical efficiency and productivity of Florida's court system over the past fifteen years which adds to a sparse yet important area of court system research and literature.

Study Focus: The Technical Efficiency of Florida's Circuit Courts

The "control of prosecution and performance of adjudicatory functions [other than those relating to arbitration or alternative dispute resolution]" is an inherently direct governmental function (Office of Federal Procurement Policy, 1992) of which a trial judge is a key actor (Jacob, 1997). The court systems of the United States represent a "direct government" function with observable outputs that can be viewed from a production, police or facilitative standpoint (Leman, 2002). One criterion for evaluating a governance tool such as direct government delivery of service is efficiency (Salamon, 2002).

The term efficiency has several connotations. Generically, efficiency can be defined as "the ratio of effective or useful output to the total input of any system" (American Heritage, 2002). Packer (1968) provided a conceptual understanding of criminal court efficiency as "the system's capacity to apprehend, try, convict and dispose of a high proportion of criminal offenders whose offenses become known" (p. 158). A more modern and broad view of court efficiency has been defined thus: "within the context of case resolution and means to use resources in their most productive fashion to produce the most of what a court system values" (Ostrom and Hanson, 1999, p. XIV). None of these definitions specifies the *type* of efficiency to be analyzed, though all suggest a focus on technical rather than allocative efficiency.

Technical efficiency "is measured by using resources data" whereas allocative efficiency focuses on cost (Nyhan and Martin, 1999, p. 355; Pedraja-Chaparro and Salinas-Jimenez, 1996). Allocative efficiency is implied when efficiency is defined as a "balance between results and costs" (Salamon, 2002, p. 23) or "obtaining the most benefit for the least cost" (Steinemann, Apgar and Brown, 2005, p. 140). Technical efficiency focuses on the "conversion of inputs into outputs" (Nyhan, 2002, p. 425). Tobin (1996) distinguished the inputs and outputs of the court's work to measure efficiencies with such ratios as cost per criminal case, cost per civil case and cost per juvenile case. While this cost ratio approach may have some important applications, it does not take resource comparisons into account, but only cost and time. In Florida, funding is formula-based, which tells very little about the relative efficiency over time of the individual circuits as organizations. It also fails to take into account the fact that while courts have some control over their human resources, the courts cannot control the input of cases. Thus, as Lewin, Morey and Cook (1982) studied “resource allocation efficiency” (p. 401) of the courts, this work studies the technical efficiency of Florida’s circuit courts rather than allocative efficiency.

The benefit of a focus on technical efficiency is that it integrates inputs and outputs as the production function and allows for comparisons of organizations in terms of efficiency and inefficiency (Nyhan, 2002; Pedraja-Chaparro and Salinas-Jimenez, 1996). Performance measurement has been rooted in the concept of relative resource allocations since the 1960’s (Cohen and Eimicke, 1998). Pedraja-Chaparro and Salinas-Jimenez (1996) make a strong argument that technical efficiency applies more rationally and practically to courts than allocative efficiency does for two reasons: 1) judicial costs are difficult to measure as inputs, so using both input and output amounts is preferable and 2) the current climate makes it difficult for a public sector organization to argue that technical inefficiencies should be tolerated to reach another objective, however worthy the objective may be. The authors strongly emphasize this point and communications with court administrators during the research for this dissertation process personally confirmed the first point (Brimmer and Benefiel, 2009). Article V, Section 14 of the state constitution delineates state and county court funding responsibilities and the data is not available as total cost, meaning an allocative efficiency analysis may be misleading.

The most commonly used measures of court efficiency are those created by the NCSC, which are based mainly on time and finances rather than relative resource utilization. Several states have collected statistics and set benchmark goals based on the NCSC CourTools performance measures. For example, South Carolina sets a benchmark for efficiency that is reminiscent of an organizational goal: 80% of cases resolved in 180 days or less. According to the South Carolina Judicial Department Annual Court Reports (n.d), from 2004 to 2008 no circuit met the goal; in fact many circuits are further from that 80% resolution now than they were in 2004. South Carolina's approach may have merit, but it does not determine the relative efficiency of the circuits in terms of their resource utilization. Instead, the circuits are compared to the goal but not to one another. Given the resources allocated to the court system, it is crucial to determine technical efficiency and productivity and benchmark both against an established standard of performance rather than an arbitrary goal of efficiency.

In the current situation in Florida, the courts have focused on the need to add judges to circuit courts, or to simply increase the input of controllable resources to the system. It is imperative, however, to have a baseline of court efficiency both within and between circuits in terms of judicial inputs and disposition outputs, to ensure that productivity is maximized before more resources are added to the system. The focus on court efficiency is not a recent phenomenon, just one that has not been studied in as much depth as have other issues relating to the courts in general or criminal courts specifically. The limited number of empirical studies on the technical efficiency of court systems will be discussed in depth in Chapters Two and Three. This work adds to the small but growing field of research on court efficiency through a focus on the technical efficiency of Florida's circuit court system. It is imperative to note that court quality is also an important issue, and that there is some trade-off, or a balancing point between "quantity and quality" and at "some point judges will be so over-burdened that their productivity will implode" (Beenstock and Haitovsky, 2004, p. 368). Researchers note that importance of court quality. Unfortunately, measuring court "quality" is a much more difficult and vague process (Ostrom and Hanson, 1999) than measuring relative technical efficiency. This work focuses only on efficiency since that appears to be a major driver of policy choices available by those who allocate court resources.

Ostrom and Hanson (1999) called it a "fundamental challenge" that the courts view increasing efficiency as inimical to court quality rather than as a means of increasing overall performance, or a "zero-sum game". This is not a recent struggle. Touching on the established conflict of efficiency versus effectiveness and the potential impacts on court processes, Heydebrand (1977) states:

> The restriction of resources relative to the increasing demands of the task environment may force a gain in efficiency and an increase in the quantitative output of courts…but gains in efficiency may also change the nature and distribution of dispositions as well as the qualitative character of the judicial process (p. 794).

Hurst (1980-1981) presents an argument similar to Heydebrand's in an analysis of court functioning from 1950-1980, noting that "observers were concerned with the quality of judicial performance, measured by criteria of efficiency and of justice" (p. 430). Where Hurst's argument begins to differ from those that preceded it is in its focus on efficiency as a measure of court performance that is not in conflict with effectiveness but rather another side of the same coin. This perspective is consistent with the work of Campbell (1977), who looked at organizational effectiveness along several measures but with productivity and efficiency high on the list. Ostrom and Hanson (1999) more recently concurred that courts "can often improve the multiple dimensions of performance at the same time. What were once believed to be real trade-offs—between case processing and timeliness, for example—may be illusions created by inefficiency or unfounded fears about diminishing due process" (p. 75). In fact, Ostrom and Hanson (1999) called efficiency "the foundation of a well performing court. Higher levels of timeliness and quality are possible by adopting a more efficient work orientation" (p. 129). This perspective has been furthered recently by another NCSC report that lists the four quadrants of court performance mapping as effectiveness, procedural satisfaction, efficiency and productivity (Clarke, Schauffler, Ostrom, Ostrom and Hanson, 2008). This study has the potential to influence court policy perspectives on the measurement of efficiency and productivity.

Significance of the Study

Little research or evidence is available to identify and explain the variability in the Florida court system's performance, in particular as it responded to the state policy intervention of Revision 7. The investigation here of court system performance is significant in the following ways: substantive, methodological, policy and practical, as contributions to court system research and policy evaluation. Each is explicated in the following sections.

Substantive Significance

Whether termed performance or outcome-based budgeting, state court systems are going to have to shift the paradigm for demonstrating a need to receive the amount of publicly allocated resources they seek. On the basic societal level, courts operate as a check on governmental power and as a way to resolve disputes within a civil, legal framework. In this light, they are essential social institutions for the nation as a whole as well as for each individual, county and state. Courts are the forum for legality to exist, promulgate and propagate. An efficient court speeds up the process of justice, opens more opportunities for access and saves public resources, but an inefficient court does less of all of these.

This study, the first of its kind to be conducted on the Florida courts, has deep implications for the practice, politics and policy of court resource allocation and for the stakeholders in that annual process. The study is based on an actual, complex public issue—resource allocation and efficiency outcomes in an entire state court system—with the practical purpose of analyzing and informing a public policy (Revision 7) that was enacted in the absence of such a study. This work follows upon a small collection of studies that have looked at court efficiency, but has much firmer and more pertinent policy implications, being based on a fully established theoretical framework that adds to the study of court systems while also making important academic contributions. The lack of such features in prior studies makes this study important socially, politically and academically. Both citizens and governments need a viable, stable, fair court system, but one that operates as efficiently as possible to maximize the resources allocated to it. The results of this dissertation should provide quantitative substance to the current debate about court resource allocation in Florida, helping with the dilemma noted fifteen years ago in Florida that "objective, empirical information alone rarely determines a staffing decision, but in these times of scarce resources, it is also rare to obtain staff without strong empirical documentation of need" (Flango and Ostrom, 1996, p. 1).

Methodological Significance

This study utilizes a longitudinal (time series and pooled), natural-experimental methodology with the circuit court as the unit of analysis. The primary statistical tool is data envelopment analysis (DEA) and its specific variants, two-stage DEA and the Malmquist Productivity Index (MPI). The DEA and MPI results are integrated with other established methods (hierarchal regression analysis and analysis of covariance) to draw solid conclusions on the hypotheses.

No other published court efficiency studies of an entire state system over time have been found that follow this methodological approach to measure and explain court efficiency. Thus, this dissertation advances a methodology that is found lacking in previous DEA court studies. The study also more accurately reflects the evolution of court studies from rational-closed to open-natural systems accounting for external influences that affect efficiency. In studying a policy shift in Florida that affected sentencing, Griset (1999) appropriately warns that the study of a single state may be methodologically non-generalizeable, but the ability to inform other states holds significant ramifications; “thus the Florida example merits scrutiny” (p. 317). Through this lens, this is a methodology that other court systems and researchers could implement, making the process generalizeable even though not necessarily doing so for the results. The results inform Florida stakeholders specifically but the methodology has the potential for use in other state systems as an enhancement for resource allocation decisions and for measurement of outcomes based on technical efficiency and productivity.

Policy Implications

At the court level, this dissertation is crucial because it provides a thorough analysis of the technical efficiency of all twenty Florida circuit courts that can be used as a data source for comparative performance analyses of the circuits as well as for analyzing the impact of Revision 7 on court efficiency outcomes. Furthermore, the quantitative results can be used to enact solid, reasonable benchmarks, in contrast to such arbitrary standards as those used in South Carolina. This study, therefore, can aid circuit court policy makers in both their external struggle for more resources and their internal desire for greater relative performance and efficiency.

To add judges or to focus on increased court efficiency is a policy issue for all three branches of the Florida state government. There are direct costs (salary, benefits) as well as indirect costs (added staff, equipment, etc) associated with adding judgeships (Tobin, 1996) that may or may not lead to enhanced technical efficiency. For proponents of increasing court resources, this dissertation provides a systematic analysis of court efficiency to supplement the qualitative argument for resource need. This analysis is designed to identify the circuit(s) that provide examples of efficiency for other circuits to study to improve performance. These contributions are similar to those in other court research using methods similar to those in this study (Kittelson & Forsund, 1992; Lewin, Morey & Cook, 1982), though neither of these examined the Florida judiciary.

The empirical, objective nature of this study furnishes policy makers on both sides of the debate with statistical analyses rather than conjecture. The study's contributions and implications are consistent with Objective II-B of the *2006-2008 Operational Plan for the Florida Judicial Branch* (Horizon 2008), which states:

> The judicial branch has embarked on an initiative to ensure a high level of court performance and accountability by providing court managers with accurate, timely information on the performance and operations of their courts. This information includes performance indicators for the processing of cases in each area of law and performance of certain court programs, and will allow court managers to enhance court performance by identifying and addressing workflow and resource allocation issues in a systematic continuous manner. (p. 7)

Courts are not politically isolated in any respect and organizational politics is influenced by both internal and external pressures and processes. Pfeffer (1981) defines organizational politics, an internal process, as "involving those activities taken within organizations to acquire, develop and use power and other resources to obtain one's preferred outcomes in a situation which there is uncertainty or dissensus about choices" (p. 7). Political skills, an external process, include "knowing how to deal, negotiate and bargain with politicians in the government by understanding their ambitions and needs" and so require organizations to participate more in the budget allocation process (Schmid, 2004, p. 109). Wiseman (1979) explains that any policy intervention is "an attempt to change patterns of power" (p. 8), which makes the process political by definition. The present work provides the courts with evidence that can drive policy choices as well as political approaches in a changing resource environment, especially now that the state of Florida can be seen as the "sponsoring organization" of the circuit courts, providing the input decisions of personnel (Eisenstein and Jacob, 1977).

Political activity represents the synthesis of organizational politics and political skills. Hazard et al. (1972) posited that courts, though lacking money, are not expected to participate in politics or lobby as other public institutions do, albeit the reality of the times is for courts to operate within a political environment and participate in such processes to obtain resources (Conference of State Court Administrators, 2003; Tobin, 1996; Glick, 1983). Jacob (1997) examined the time a Cook County, Illinois Chief Judge spent on politics at all levels to obtain funds for buildings and staff (local), new judgeships (state legislature) and budget increases (State Supreme Court), and the results were impressive. The reality is that courts are *having* to do what they *ought not* have to do, in order to influence judicial resource allocations.

The recent results of the political activity by the Florida courts have been mixed. Johnson (2004) reports that heavy lobbying and judicial involvement from high court members brought additional funds for trial courts but that over a two-year period none of 88 new judges certified by the court were approved by the legislature. Carlson et al. (2008) noted the wide gap between court funding requests from the judiciary and the much lower allocations by the state. Evidence of technical efficiency and productivity could change such outcomes for the courts.

Insight into the political impacts on efficiency is another area that is missing from court policy research. Perhaps the most telling aspect of the courts' political activity is that they are known to lag behind in using statistical data to acquire resources (Strickland et al., 2008) in the manner that correctional stakeholders have found successful (O'neill, 2003). Police can point to changes in crime rates, what Coe and Weisel (2001) dub "an ace in the hole" in "competing for limited resources" (p. 718). The courts need data and statistical analyses to augment their argument politically, and this dissertation seeks to provide that. For judicial actors, showing a need for more resources has been posited as a successful component of actually acquiring them (Hartley & Douglas, 2003). This dissertation helps to build evidence-based policy for circuit courts resource acquisition and utilization.

Practical Contributions

On a practical level, this dissertation advances the notion that publicly funded entities, even such social institutions as court systems, should be held accountable for their results in relation to the inputs required to operate them (Buenger, 2004). It should be as indefensible for internal court stakeholders not to want to know where their court ranks against other courts in the same system in terms of technical efficiency and productivity as it would be for those allocating resources not to know what they are receiving in return for the public investment. In the current public climate, to argue for more resources without knowing where a circuit ranks amongst its peers is not practical, nor is it practical to push for greater efficiency without knowing a court's current or past efficiency outcomes.

Organization of the Study

This dissertation:

- defines and examines the need for an empirical study of Florida's circuit courts' efficiency and productivity and the policy implications of the study (Chapter One)
- lays out and advances a theoretical and conceptual framework for analyzing the courts from an organizational and systems perspective in relation to technical efficiency, by presenting the current debate, examining previous studies and adding to the academic literature by studying the effects of a specific statewide policy (Chapter Two)
- conceptualizes important study variables, applies the established research designs on court efficiency conducted in other states and nations to the Florida circuit court system through use of existing secondary data sources (Chapter Three)

- uses empirical methods to present descriptive statistics, determines the technical efficiency and productivity of Florida circuit courts over time in relation to Revision 7, and analyzes the changes in productivity and efficiency in system and circuit judgeships (Chapter Four)
- uses the empirical results and hypothesis tests to draw conclusions, discuss policy implications and create benchmarks, and states the limitations of the study as well as areas for future research (Chapter Five)

Hypotheses

This study tests the following three hypotheses, which are all derived from the literature:

H_1: Florida's circuit courts are relatively more efficient since the implementation of Revision 7 (2004/05-2007/08) than they were after its passage (1998/99-2003/04) or before either (1993/94-1997/98), controlling for other factors.

H_2: Efficiency changes over the time periods related to Revision 7 will not be consistent for all circuit sizes.

H_3: Increasing judgeships at the system or circuit level reduces productivity.

CHAPTER TWO: THEORETICAL AND CONCEPTUAL FRAMEWORK

Introduction

The main theoretical and conceptual logic guiding this analysis is that courts are public institutions operating within a broader systems framework. Courts are influenced by their internal and external environments in terms of receiving and using their resources more efficiently. Organizational theory is crucial to understanding how institutional organizations within a single state system are expected to respond to environmental and political pressures to increase operational efficiency and productivity. In essence, courts should act as any other organizational entity does when resource scarcity exists within a resource-dependent structure, but do they? Systems theory provides the foundation for studying the inputs, throughputs and outputs of a judicial system that is facing both internal and external pressures to become more efficient since the Revision 7 policy intervention.

This chapter therefore proposes an integrated theoretical and conceptual basis for analyzing the Florida circuit court system from the standpoint of technical efficiency—the relative relationship between judicial inputs and court outputs—and the effects of Revision 7. To begin building this model, one must research the context of the current policy debate centered upon productivity: adding judges versus increasing efficiency.

The Current Policy Debate in Florida

The academic influence on the modern role of criminal courts in society is best described by Herbert Packer (1964) as "an interesting paradox: the more we learn about the Is of the criminal process, the more we are instructed about its Ought and the greater the gulf between Is and Ought appears to become. Is and Ought share an increasingly uneasy co- existence" (p. 3). Miller (1973) noted a similar paradox within the criminal justice system, where change and stability exist simultaneously over time. The current court debate in Florida focuses on this paradox: how many judgeships the courts should have (Ought or change) versus how efficient the current judges are (Is or stability). Ostrom, Ostrom, Hall, Hewitt and Fautsko (2000) touched on this paradox while comparing the Delphi approach versus a weighted caseload approach to adding judgeships in the Florida courts:

> Inherent in the development of case weights is the issue of "What is" versus "What ought to be." In other words, the relationship between measuring current case processing practice ("what is") and assessing when current practice requires judges to take too little (or too much) time to handle cases in a satisfactory manner ("what ought to be") (p. 34-35).

Ostrom et al. (2000) reported that judges participating in the Delphi process greatly overestimated the need for new judgeships, though there was an empirically established lesser need for more judges according to the weighted caseload calculations of nine courts for two months generalized to the entire system. However, Ostrom et al. did not consider relative efficiency or the reasons why it may vary among circuits. Both sides of the debate will be presented here shortly in their theoretical contexts. What has been missing, and what this dissertation adds is the evidence of how efficient the courts have been with the resources they *are* allocated and why, i.e. forsaking what "ought" to be for what has been and what is. This is essential as Article V, Section 9 of the Florida Constitution provides the legislature with the final determination as to the number of judges allocated to the circuits annually (Florida State Constitution, n.d.).

This policy debate is not unique to any American judicial system. In a policy paper for the Philipino House of Representatives (2004), the argument is made that more judges are needed for the caseload handled. The reason for the court backlog thus rested on the lack of personnel, and this created a "dilemma of judicial prudence versus expediency", an assertion repeated in reports on efficiency of judicial systems in both the Bahamas (Rowles, Mackey and McMillan, 1993) and Brazil (da Conceição Sampaio de Sousa and Schwengber, 2005). In an efficiency study that included a short section on court caseload backlog and support personnel in Belgium, Tulkens (1993) concluded that there is more need for additional resources than for increases in productivity to reduce year-over-year case backlogs. When the Norwegian courts began to have similar backlogs, "the judges and staff blamed insufficient allocation of funds but the political authorities had not been persuaded to provide more, suggesting instead that there was more room for efficiency in the courts themselves" (Kittelson and Forsund, 1992).

The argument against adding judges to increase court efficiency was also studied using panel data from the Israeli courts. Beenstock and Haitovsky (2004) reported:

> Our results imply that appointing more judges does not stabilize the backlog, except possibly in the smaller magistrate courts. If more judges are appointed, the existing judges will simply adapt their behavior by reducing their productivity as measured by dispositions. This implies that

> the backlog apparently has a life of its own and that it does not depend on the number of judges. (p. 366)

The previous discussion here has shown how the current policy debate transcends borders, cultures, justice systems, ideologies and perspectives. The Florida Supreme Court, before Revision 7 was enacted, was on record as stating "it is clear to this Court that adding judges alone will not ensure increased efficiency" in the court system (Florida Supreme Court, 1995). Earlier research focusing on the criminal courts in the United States presages the recent findings in Israel. Glick (1983, p. 65) noted the evidence has found "the size of a criminal court's workload is not related to the time used to decide cases" while Church (1978) went a step further, stating that a historical review of the literature showed that "criminal caseload helps very little to explain differences in processing time either between courts, or in the same court over time" (p. 25). More recent research has reached similar conclusions (Ostrom and Hanson, 1999). Note that, in the Florida system it is difficult to examine criminal courts alone, as they are part of the whole circuit organizationally and not funded or allocated resources separately. A holistic circuit approach is more applicable.

A recent NCSC study commissioned by the State of West Virginia (Uekert, Douglas, Schauffler, Kleiman, Maggard and Stenjborn, 2006) mirrors the Florida debate. The report states that "as workload rises, judges can and do work faster" (p. 2), a finding counter to the position that more judges are needed to improve productivity or efficiency. Despite the observation that judges "can and do work faster", the report acknowledges that "the principal challenge to conducting a new study of judge need is that judicial resources are not sufficient to keep up with an increasingly complex caseload" (p. 1), thus implying that more judges are indeed already needed. Using weighted caseloads and ratios, the report determined that West Virginia in fact needed 11.5 more judgeships than the current total of 66. Again, this report does not look at the relative efficiency of the circuits but simply the need for more judges. The focus, however is the entire circuit, and not just one division.

The current debate, on both sides, is too simplistic. Heydebrand (1977) proposed three approaches to this problem. The position of many in Florida that more judicial resources are needed reflects the "professional strategy of reform" that would "increase the level of resources in order to enable courts and judges to respond more adequately to the increasing demands made upon them by their environment" (Heydebrand, 1977). That position is described as well by Carlson et al. (2008) as "judge-centric, assuming the traditional adversarial process as the fundamental task of the court" (p. 61).

State policy and budget makers, on the other hand, have been increasingly pressing the courts to be more efficient with the resources already allocated. This focus is described as the "bureaucratic-administrative response" of making more efficient use of existing resources (Heydebrand, 1977). Anecdotally, circuit judges posited that the state harbored a "perception the judicial branch was unresponsive to more efficient and effective management of the courts" (Carlson et al., 2008, p.59).

Heydebrand (1977) called his third approach the "the technocratic strategy," which "seeks to expand resources (e.g., judgeships), but also to raise the productivity of judges." This approach embodies more theoretical complexity than the simple "add judges" versus "increase efficiency" debate. Systems theory can analyze inefficiencies within a system to allocate properly the resources that may or may not be required according to the outputs attained for the inputs given. Organizational theories—specifically institutional and resource dependency theories—provide a framework for predicting how courts as institutional organizations should respond to external pressures for greater efficiency in an environment of scarce resource availability. This theoretical framework is built upon *response* to the external environment, a clear constraint of Revision 7. Thus, this study informs both sides of the current debate by building an integrated theoretical framework applicable to the analysis of efficiency and productivity outcomes in Florida's circuit courts.

Prior Studies of Technical Efficiency in Court Systems

The literature has taken several approaches to the study of the courts: viewing courts from organizational and systems perspectives; analyzing the technical efficiency of court systems; examining the processes of courts; and seeking to understand how environmental factors affect court efficiency. Each of these histories is touched on separately because they have been studied individually, with no conceptual integration.

The history of input-output-oriented court studies and their focus on efficiency can be traced back in the United States to the 1950's (Nardulli, 1978). The main weakness of the early studies is that they often lacked an empirically grounded theoretical framework for how courts handled their tasks, and the methodologies used were often inadequate (Nardulli, 1978). In addition, many of the works reviewed by Nardulli had a narrow focus on singular court aspects such as bail, plea bargaining and sentencing rather than a holistic view of technical efficiency such as Lewin, Morey and Cook (1982) would initiate. The present study is constructed by heeding the cautions voiced by the former, using the foundation laid by the latter and being informed by both.

Most of the prior research on the technical efficiency of courts has taken an input-output systems approach or an econometric perspective (see Table 1 for a full chart of authors, country, purpose, sample size, units of analysis, methods and findings). The first quantitative technical efficiency study, and one of the few published on an American state court system, was conducted by Lewin, Morey and Cook (1982). Using data from 1976, the authors found 11 of 30 North Carolina circuit criminal courts to be relatively inefficient. Other studies that employed methods similar to those in as this dissertation have also used the input-output system approach, but for research on courts in other nations (Schneider, 2005; da Conceição Sampaio de Sousa and Schwengber, 2005; Beenstock and Haitovsky, 2004; Pedraja-Chaparro and Salinas-Jimenez, 1996; Tulkens, 1993; Kittelson and Forsund, 1992).

Table 1: Previous Empirical Studies of Court Efficiency

Authors, Year, Country	Purpose	Sample Size and Units of Analysis	Methods (Presented in the order applied)	Findings
Lewin, Morey and Cook, 1982, United States	To determine the relative efficiencies of NC District Courts by district and county	All 30 North Carolina Superior Adult Criminal Courts (comprising 100 counties) using data from 1976 (cross sectional)	100 counties: Correlation analyses; regression analysis; log-log stepwise regression. 30 Districts and 100 counties: DEA; ratio analysis	19 of 30 districts were efficient; 11 of 30 were inefficient; Courts can be analyzed using DEA, a method preferable to ratio analysis
Kittelson and Forsund, 1992, Norway	To measure the technical efficiency of the Norwegian District Courts and suggest ways to improve efficiency	107 Norwegian District Courts (the lowest of three tiers in the judicial system) that are classified as diversified courts (N=91), general city courts (N=6), specialized city courts (N=10) from 1983-1988	Pooled DEA analysis (6 year average); Correlations of inputs and outputs for each of the six years and the six-year average; Malmquist productivity index	The loss of efficiency is related more to scale than to technical inefficiency
Tulkens, 1993, Belgium	To analyze the productive efficiency of lower court judicial decisions in relation to a growing backlog	187 Justice of the Peace Courts (one judge and staff) from 1983-1985 that handle minor monetary value cases and those of local character; court size was used.	DEA and FDH (Free Disposal Hull) were both utilized and compared; Distribution of efficiency scores (IOTA values) over time; Formulation of equation to measure productivity gains if utilization of "peers' best practices" occurred versus the increase in productivity if staff were added	DEA is preferable to FDH in determining production efficiency. Mid-size courts had the highest proportion of inefficient DMU's. Only 35% of backlog could be reduced if courts (judge & staff) adopted the best practice of peers, while 70% of the backlog would not be reduced. Thus, an increase in personnel (staff) is justified and recommended.

Authors, Year, Country	Purpose	Sample Size and Units of Analysis	Methods (Presented in the order applied)	Findings
Pedraja-Chaparro and Salinas-Jimenez, 1996, Spain	To analyze the technical efficiency of the Litigation Administrative Division of the Spanish High Courts; to calculate avoidable (backlog)	21 courts for the year 1991	DEA (CRS) Regression to test whether court size determines efficiency, which would require a VRS analysis	Just 5 of 21 courts were efficient (1.0); it would be an enhancement to use longitudinal approach rather than cross-sectional.
Beenstock and Haitovsky, 2004, Israel	Using micro and macro economic theory, to find out if adding judges had the effect of decreasing court efficiency	The Israeli Supreme Court,1964-1995; 5 District Courts, 1975-1994; 19 Magistrate Courts, (3 large, 1975-1994 and 16 small,1980-1994)	High court data not pooled; lower courts are pooled within the group. Co-integration analysis (single and multiple equation for non-pooled; panel methodology for pooled) Econometrics approach	Caseload is endogenous, not exogenous. Increased workload per judge increases efficiency; adding judges makes judges/courts less efficient.
da Conceição Sampaio de Sousa and Schwengber, 2005, Brazil	To analyze the technical efficiency of the Brazilian courts in one state. Calculation of judicial backlogs	161 Brazilian courts, using data from 2002 & 2003	Free Disposal Hull (FDH) compared to order-*m* approach rather than DEA	FDH approach found 57% of courts to be efficient. Court size determines efficiency due to economies of scale using FDH, but less using order-*m*. Adding judicial personnel can reduce the backlog.
Schneider, 2005, Germany	Analyze how the organization of Germany's civil-law judiciary impacts court performance as measured by appeals conformation and technical efficiency; the focus is judges' career advancement rather than the courts	9 German Labor Appeals courts pooled 1980-1998 (171 observations); the units of analysis are 230 judges.	DEA: output-oriented window analysis with courts pooled over time Regression: the DEA score obtained is used as an independent variable in the regression model.	Judges' qualifications (PhD's) and career incentives influence the productivity of the court. The average DEA score for the study was 88.84, ranging from 56.55 to 100.00.

Table 2 below discusses the NCSC studies on court performance, efficiency and/or judicial need in terms of their focus and findings.

Table 2: NCSC Studies of Efficiency and/or Judicial Need

Author(s) & Year	Study Focus	Findings
Church, 1978	Why cases are processed faster in some courts than in others and what factors account for this variance?	Delay is determined not by court processes but by the legal community that works within the court.
Flango and Ostrom, 1996	To provide a framework for evaluating the needs for additional judgeships; looks at the current practices and approaches of all 50 states (data used is from a hypothetical state).	Proposes using a regression model to calculate and predict judgeship needs (not an empirical study); regression is an appropriate statistical technique to predict judgeship needs.
Ostrom and Hanson, 1999	Efficiency and timeliness in 9 different state criminal courts (not circuits) in 9 states; analyzing the differences based on court cultures, case types, workgroup participant attitudes, case characteristics, manner of case disposal	The 9 courts are very similar in workload type; there is no relationship between per-judge workload and case processing time; court caseloads are handled relatively equally, and faster courts do not use assembly-line justice; the more expedient courts viewed resource allocation as adequate; the manner of disposition relates to case processing time; efficiency frontier analysis is applicable to the study of courts.
Ostrom et al., 2000	Establishing a formula for weighted caseloads in Florida circuit courts via time study compared to Delphi utilization; determining judicial need empirically, using time as compared to perceived need of judges	Judges work a 215-day year; judges perceived much more time needed per case than the time study found; case weights alone are not an accurate method to determine needed judgeships; as based on case weights combined with time per case (in minutes), the circuit courts were 42 judges short; the current certification standard is too high.
Uekert et al., 2006	To determine the need for additional judgeships in West Virginia using a weighted caseload approach	West Virginia needed 11 more judges according to this analysis; judges work 209 8-hour days per year, 6.5 hours of which are hearing cases.

Courts as Organizational Systems

Court systems have been observed from many organizational perspectives. As far back as 1926, Schick noted that "courts, in a comprehensive sense, are but business institutions, managed by human agents for human purposes" (p. 112-113). Though not market-based organizations, courts are "typical of public service production units" in their organized structures and tasks (Kittelson and Forsund, 1992, p. 277). Parsons (1956) listed courts as among the integrative organizations that contribute mainly to societal level efficiency, not effectiveness, with their main value being economic rationality or "the maximization of production with minimal cost in the economic sense" (p. 230). Such an approach fits what Rovner-Pieczenik (1978) called the Rational Actor Model. Under this framework, court actors structure processes to reach an organizational objective that often becomes the "most efficient alternative, the alternative that maximizes output for a given input" (p. 3). When caseloads are high and resources are low, rationality assumes that from an internal standpoint efficiency will become the court organization's main objective. Early input-output studies assumed this rational-internal approach, missing many other factors that influence court outcomes and behavior, instead applying a rational system framework of goal specificity and a highly formalized structure (Scott and Davis, 2007). However, a transition had begun from a rational framework to a natural systems focus that included the ecological contexts in which courts operated.

In the 1970's, court research, mainly focused on the criminal courts, began to embody several organizational perspectives. Levin (1972) compared the courts of Pittsburgh and Minneapolis, finding that each seems to reflect its political environment in terms of the outcomes of the court process. Feeley (1973) applied organizational theory to courts from an "institutionalized interaction" standpoint, noting that criminal justice systems, when viewed from a functional-systems perspective, are rooted in cooperation, exchange and adaptation, all of which are influenced by the institutionalized nature of the system. An often-cited book of this time period is *Felony Justice: An Organizational Analysis of Criminal Courts*, by Eisenstein and Jacob (1977). In *Felony Justice*, courts are viewed as organizational systems in which the courtroom work group performs tasks and processes through interconnected interactions of mutual dependence in which each actor has a specialized role and the group produces a stable setting. With regards to efficiency, Eisenstein and Jacob note that a major goal of external pressure on the work group is to handle cases expeditiously, with judges and prosecutors using high "disposition rates to transmit an aura of efficiency and accomplishment" (p. 26). They found organizational and contextual environmental differences among the three city felony courts they studied—in Baltimore, Chicago and Detroit—that influenced felony dispositional processes and outcomes. Eisenstein and Jacob's work has been important in moving the study of courts beyond the courtroom itself by considering the influences of external environments on court activity, though with a focus still on actors within the criminal courts and how they process tasks.

The studies of this period reflect a focus rooted in natural systems framework: "collectivities that pursue multiple interests, both disparate and common, but who recognize the value of perpetuating the organization as an important resource" (Scott and Davis, 2007, p. 30). The Organizational Process Model of courts as proposed by Rovner-Pieczenik (1978) similarly posits that the consensus of courtroom work groups is a desire to create established processes that promote stability and normative routines. In these terms, efficiency is not an end in itself, but a means to institutionalism through consensus, reflecting the natural systems hallmarks of goal complexity and informal structure (Scott and Davis, 2007). Consistent with this framework is the work of Church (1978), who attributed court delays to the "informal expectations, attitudes and practices" of courtroom actors rather than to court processes. Church posited that change occurs only when the legal community views delay as an institutional concern that could be seen as a public problem. Hagan, Hewitt and Alwin (1979) studied how probation officer participation in the presentence investigation process influences sentencing from an organizational system standpoint. The authors deemed that policy change to be largely "ceremonial" in nature, since the components of the "loosely coupled" criminal justice system are dominated by the needs for legitimacy and efficiency. Hurst (1980-1981) echoed this approach in stating that guilty pleas are not merely related to efficiency, but also serve "the survival of trial courts" by legitimizing court process. Court studies have transitioned from a rational to a natural systems perspective with which institutional and resource dependency theories are associated (Scott and Davis, 2007).

Mohr (1976) was skeptical of using organizational research to analyze courts in terms of their processes, but conceded that research into "adaptation to the environment presents a promising explanatory paradigm" (p. 625). That approach, used in other research of the time (Nardulli, 1978; Heydebrand, 1977) as well, combines internal processes with external influences for the specific study of court systems within the broader criminal justice system. Louthan (1979) built upon this conceptualization of courts as the study of an institutionalized legal "market" where exchange occurs among interdependent actors who have "boundary-spanning" roles. These studies are important in representing the shift from a natural to an open-systems approach that views organizations as "congeries of interdependent flows and activities linking shifting coalitions of participants imbedded in wider material-resource and institutional environments" (Scott and Davis, 2007, p. 32). The following review of court organizational literature exhibits the hallmarks of open natural systems thinking: courts are self-regulating in terms of environmental resources, must expend energy on maintaining boundaries, are part of a larger system that is loosely coupled and increasingly complex in both goals and operation (Scott and Davis, 2007) while also perpetuating the court as an end in itself and using its processes to enhance legitimacy and survive. These studies often focus on criminal courts rather than family, civil or circuit courts holistically.

For Nardulli (1978), the analogy between courts and other types of organizations in their collective efforts to pursue common ends (e.g. efficiency) while accounting for "environmental constraints" is perhaps "the most significant contribution" of organizational theory to the study of criminal courts (p. 67). Jacob (1997) attributed the predictability of entire courts to the tight internal coupling inherent in the court, while also acknowledging the presence of external organizational influences. The process of plea bargaining, which is one such predictability, is a result of displaced and complex goals, mutual system interdependence and the spanning of boundaries (Eisenstein, 1973), a description reminiscent of an open system (Scott and Davis, 2007) in which there exists environmental interaction**.** Reiss (1990) notes that while it has been long recognized that courts are organizations, previous research has lacked a foundation in broader systems theory to explain changes in court process, how the institutional legal system and the larger social system create conflicts and how they should be settled. In other words, the court cannot be separated from the larger systems (Reiss, 1990) or environments (Heydebrand, 1977) in which it is embedded. Jacob (1997) described this as the ecological approach of the "interorganizational politics of the courts", noting that like any organization, courts seek to protect their functions from the assault of external entities. Efficiency can be seen as simply an end in itself, or as a means to achieve that protection.

Ostrom, Ostrom, Hanson and Kleiman (2005) recently identified four types of courts based on different organizational cultures. In hierarchal court cultures, the focus is on rules and the pursuit of efficiency, with the goals being stability and predictability; efficiency reflects the leadership of the organization as well as strategic planning (Ostrom et al., 2005), a characterization reminiscent of the natural system. Two Florida counties (Pinellas and Duval) were included in this study apart from their respective circuits. The authors placed both county court cultures in the autonomous quadrant, characterized by sovereignty, continuity with the past and constrained change. This work of Ostrom et al. (2005) is important as a benchmark in the study of court organizations: the culmination of integrating natural system goals with open system characteristics.

The study of court performance can be guided by the institutional and resource dependency frameworks that emerged concurrently with the above research: courts will act from a legitimacy and survival standpoint in response to their resource environment like other organizations, while considering the goals of the system. This is clear in the words of Buenger (2004, p. 16) who asked:

> How does the state judiciary (at all levels) maintain access to the courts and its decisional independence when its evolving institutional independence is now so tied to resources that are in competition with the politics and spending priorities of the legislative and executive branches of government?

Consistent with this framework is the perspective that institutional norms constrain courts from against appearing political or aggressively competing for resources from sources on which they depend, placing them in a "Catch 22" situation (Hartley & Douglas, 2003). Courts are simultaneously independent and dependent, facing both internal and external pressures for efficiency, a situation whose analysis requires a theoretical framework that considers both internal (institutional theory) and external (resource dependency theory) perspectives.

Stover (1981) studied a single prosecutor's office, applying organizational theory in the context of decision-making and scarce resources, and concludes that this type of framework is applicable to nearly all organizations. Revision 7 has affected Florida's courts at the institutional level by created a resource dependency relationship with the state that had not existed before and is similar to the effects of this policy shift in other states (Tobin, 1981). Pfeffer and Salancik (1978), pioneers of resource dependency theory, found it was crucial to analyze the conditions of "social control of organizations to understand how organizations decide to comply with or attempt to avoid influence" (p. 44). More generically, resource dependency theories "analyze how organizational managers try to obtain crucial resources from their environment, such as materials, money and people" (Rainey, 2003, p. 87). Perhaps most noteworthy is that legislatures in this type of relationship can be seen as both "input and output regulators" in the sense that they control the courts' resources and can influence the dispositional strategy of the courts as well (Nardulli, 1978).

Several options are available to institutional organizations in a resource-dependent predicament: adapting to the environment (Rainey, 2003; Oliver 1991), competing for more resources (Sherer and Lee, 2002), defying the entity on which they depend to obtain more resources (Rainey, 2003; Oliver, 1991), or any combination of those alternatives through a variety of stages (Wiseman, 1978). Cohen and Eimicke (1998), consistent with this theoretical framework, posited that in times of economic downturn, organizations such as courts can resist change and act defensively, or they can "embrace change as a survival strategy, recognizing that their best defense in a cutback environment is enhanced productivity" (p. 10). However, as Jacob (1997) warns, the appearance of both loose and tight coupling within the courtroom workgroup of even a single circuit can keep change slow in practice on a micro-level although the macro-level goals call for it. This is a striking statement in that 30 years earlier, in a more macro-view, Jacob (1965) called the courts an institution "resistant to change and innovation" as compared to other governmental entities. Courts may prefer a stable, institutional structure, but they are now in an environment of resource scarcity. Consequently, whatever their preference, they must become more efficient if for no other reasons than to obtain resources or enhance legitimacy.

This is the situation in which institutional theory informs the study of courts; in the present resource environment institutional theories seek to explain how some organizations are able to manage structure and process over time in response to the environment, transitioning to a structure and processes that perpetuate their stability and legitimacy. Carlson et al. (2008) are clear that the premise of funding the courts through Revision 7 was

> that each vicinage/circuit should have the same programs, services, and staffing levels. When the funding was allocated so that each vicinage/circuit had equivalent resources, equity of outcomes was assumed to have been achieved. Equity was measured by comparable fiscal resources, not using measures of equal access or equal justice from the litigant's perspective (p. 16).

From an external standpoint, equitable resources make the circuits “the same”. From an internal perspective, Selznick saw “institutionalization as a quest for organizational immortality and protection against the vagaries of competition, including particular sets of resources” (as cited by Pfeffer, 1982, p. 239). DiMaggio and Powell (1983) theorized that over time organizations in the same field go through a process in which they become similar. In line with that reasoning, courts are high on isomorphism’s both normative [similarly based on law, tradition and norms] (Rovner-Pieczenik, 1978; Feeley, 1973) and mimetic (modeling processes, programs and tasks on one another). However, the presumed independence of the judiciary means that coercive isomorphism may be resisted. Coercive isomorphism results from external environmental and cultural forces exerted upon an organization by one on which they may depend (DiMaggio and Powell, 1983); that is the present condition of the courts in Florida. Thus, the question becomes: can the courts be ‘coerced’ into being more efficient and thus more similar, especially as they become more “institutionalized” at the state level (Buenger, 2004)?

Hall (in Netsch, 2005) cited enhanced efficiency as the third tactic most courts have employed to deal with the current budget situation, with increasing revenue and cutting expenditures the other two options. Of those, the former restricts access to justice and the latter diminishes its quality. The pursuit of efficiency is evident as “courts, faced with increasing caseloads, have learned and incorporated more efficient caseload management process to avoid delays” (Champion, Hartley & Rabe, 2008, p. 56). It has also been noted that withholding resources in essence forces a court to operate more efficiently (Heydebrand, 1977) even if its desire to do so is not strong. The author’s observation is consistent with the strategic choices between institutional resistance and survival through change and the theoretical integration structuring the present study forms the framework of strategic choice within the context of environmental and political constraints (Greening and Gray, 1994).

The rational system framework theorizes that courts would seek to maximize efficiency because it is rational to do so. The natural systems framework assumes that courts would embrace efficiency as way to protect their functions, maintain independence and enhance their institutional legitimacy. The natural-open system framework integrates the notion that courts will increase their efficiency outcomes based on natural system goals with the notion of taking on open system characteristics: environmental influence, loose coupling, maintaining boundaries and having increasingly complex goals and operation. Since Florida's courts knew the 1998 vote would change their funding scheme they began immediately to prepare for its effects (Carlson et al., 2008). As they faced the options of adapting or resisting, but hoped to survive as "independent" organizational entities, these theories inform us that their best strategy would be to increase productivity with existing resources: to become more technically efficient. Although court actors can resist legislative change in some matters like mandatory sentencing (see Tonry, 2006), budgetary decisions are not as easy to resist or defy. Thus, the first hypothesis to be tested is:

H_1: Florida's circuit courts are relatively more efficient since the implementation of Revision 7 (2004/05-2007/08) than they were after its passage (1998/99-2003/04) or before either (1993/94-1997/98), controlling for other factors.

The prior literature on court efficiency in general (Flango and Ostrom, 1996) and specifically on Revision 7 (see Carlson et al., 2008) suggests that efficiency outcomes may well vary with circuit size. The circuit courts in Florida vary greatly in the sizes of the populations they serve. Some are spread out across several counties, and some are composed of only a single county. Size may play a role for many of the courts that are either very large or very small. For example, the Sixteenth Circuit in Florida represents a single county (Monroe) and had a population of 78,987 in 2007/08, while the Eleventh Circuit, representing Dade County only, had a population of 2,462,292. These size discrepancies may bring distinctive factors into play that could affect efficiency, including but not limited to: the norms of a different "local legal culture" (Ostrom, Ostrom, Hanson and Kleiman, 2005); the political environment of the courtroom workgroup both internally and within its jurisdiction (Glick, 1983; Eisenstein and Jacob, 1977); the expectations and politics of the court community (Nardulli et al., 1988); the struggle for power between actors (Rovner-Pieczenik, 1978); and/or the methods of case flow management (Glick, 1983). The Florida judiciary itself recognizes circuits as small, medium or large. Ostrom et al. (2000) found that in more rural circuits than urban circuits, judges devote relatively less time to casework. This is consistent with the high correlation (r = .80) between population and criminal court days held in North Carolina (Lewin, Morey and Cook, 1982). In their recent analysis of Israeli courts, Beenstock and Haitovsky (2004) found that only in the smaller magistrate courts in their sample did "dispositions depend upon the number of judges" (p. 365).

Prior research has found court size to be related to efficiency in varying degrees. Tulkens (1993) reported mid-sized Belgian courts as having the highest percentage of inefficient courts. Efficiency outcomes are noted to be sensitive to economies of scale (da Conceição Sampaio de Sousa and Schwengber, 2005; Pedraja-Chaparro and Salinas-Jimenez, 1996; Kittelson and Forsund, 1992). Carlson et al. (2008) discussed how Florida, New Jersey and Washington all account for circuit court size in funding on the presumption of the varying economies of scale as courts go from small to large. A majority of states (74%) include population as a determinant in assessing judicial need (Flango and Ostrom, 1996). Even though DEA methodology can account for varying returns to scale, it is important to inquire whether Revision 7 has improved the efficiency of the courts across all three size groups. Thus, the second hypothesis is:

H_2: Efficiency changes over the time periods related to Revision 7 will not be consistent for all circuit sizes.

The first two hypotheses relate directly to the policy change of Revision 7 in Florida. Their inquiries are integrated with the current, more broadly based policy debate over adding judges versus increasing efficiency and productivity. The NCSC has used weighted caseload approaches in Florida and West Virginia and found that both systems needed more judges, though that policy recommendation was not rooted in the study of relative efficiency or productivity. Heydebrand's (1977) proposal that court systems could add judges and increase productivity is theoretical, but not empirically tested. In the only study of court technical efficiency in the United States, Lewin, Morey and Cook (1982) did not wade into this policy debate. Kittelson and Forsund (1992) acknowledged the technical efficiency approach but did not examine it theoretically. Similarly, the discussions in previous research that are rooted in the approaches observed by Heydebrand, namely increasing judgeships or increasing efficiency, concern policy positions and not theoretical frameworks.

One policy perspective in the court funding debate focuses on the potentially damaging impacts on court effectiveness that are bound to ensue from limited allocations of resources. The rhetoric highlights interference with the functioning of the court (Hall, Tobin & Pankey, Jr.

2004) to the point when inadequate funding may delay or deny justice, even “cripple or eventually destroy” the court system, which is a co-equal branch of government and not simply a social “service” (Medlin & Billings, 2003). Miller (2003) questions whether “this quest for efficiency through management promoting pretrial dispositions at the expense of other values long thought central to the goals of the civil justice system” (p. 1007) is a positive transformation of the judiciary. Research on international court systems has proposed that court backlogs, or inefficiencies, are caused by a lack of judicial resources (da Conceição Sampaio de Sousa and Schwengber, 2005; Phillipino House of Representatives, 2004; Tulkens, 1993; Rowles et al, 1993). Chandler (1960) made the argument that the increase in federal judicial caseload required more judges, specifically stating that “undoubtedly the methods of handling cases in the district courts can be further improved. But it cannot reasonably be expected that by the most efficient practices those courts can make up for the present deficiency in judge power” (p. 152). Interestingly enough, though judicial groups called for more judgeships, none were funded by Congress (Chandler, 1960), foreshadowing the current events in Florida.

The other side of the debate—increasing efficiency—has also appeared in the literature. Herbert Packer (1968), in developing his well-known dichotomous view of the criminal process, conceded that there was a growing disconnect between the capacity of the courts and their allocated resources, but noted that “the line of solution of throwing more resources” at the problem has not been accompanied by “systematic work done on the extent of those needs” (p. 66-67). As mentioned earlier, prior to Revision 7 the Florida Supreme Court (1995) took the position that adding judges alone is not the answer to increasing court efficiency. One international study, noting the dearth of published literature on the topic, posited that adding judges had the effect of actually reducing court productivity outcomes in Israeli courts (Beenstock and Haitovsky, 2004).

The present study tests the theoretical framework for the assumption that courts can add judges and increase productivity (Heydebrand, 1977) by joining the viewpoint of the Florida Supreme Court (1995) and Beenstock and Haitovsky (2004). Thus, the last hypothesis to be tested is:

H_3: Increasing judgeships at the system or circuit level reduces productivity.

Theoretical Relevance

In addition to the policy implications of this study that have been noted, the study contributes to the literature on court efficiency and to relevant theory. Do courts and court systems act just as other institutional organizations and systems would in a resource dependent situation? Can court systems and circuits add judges *and* increase their productivity? Answers to these questions will be the main theoretical contribution to the study of court system efficiency. The process of finding the answers will contribute to the literature on policy interventions, organizational efficiency and performance measurement relative to state circuit courts. The final academic contribution of this work is to advance the study of state court systems by using more advanced methods and theoretical frameworks than found in the only other study of this kind on US courts, which looked at criminal courts only (Lewin, Morey and Cook, 1982).

A large body of research literature has examined the behavior of individual judges and even the decisions of circuits, analyzing the group decision making of the courtroom work group and making quantitative claims about the "ought" of court work and personnel needs. However, it has been 28 years since a study of this type has been published on US courts, and that study did not analyze specific policy. Moreover, the present work studies an entire state system over time, moving beyond the case study approach of the 1970's and the cross-sectional approach of Lewin, Morey and Cook (1982) to examine courts as organizations from the standpoint of technical efficiency and productivity. In fact, no other published studies have combined resource dependency and institutional theory frameworks in the examination of the technical efficiency of court systems while focusing on a specific state policy (Revision 7) or a broader policy debate (adding judges and increasing efficiency). If courts act just as other organizations are expected to in response to their resource environment, a more open-system theoretical framework may be applicable to their study. If they do not, however, a more court-specific theoretical orientation may be applicable to the study of court efficiency and productivity outcomes. In this case, a new variant of natural system institutionalization may be required. Without empirical inquiry such as this study presents, the argument will remain qualitative and the study of court efficiency relative to policy interventions will not advance as it needs to. Furthermore, this work is the first to notice and integrate systems theory over the span of court studies over the last century.

Thus, the focus on a pertinent public policy problem, evaluation of a statewide policy intervention that lacked evidence at conception and implementation, the comprehensive literature review and the application of several efficiency techniques create an evidence-based, empirical contribution the field of state court systems study needs to inform a specific state policy and a broader court policy debate.

CHAPTER THREE: RESEARCH METHODS

This chapter lays out all the pertinent areas of the research design: the units of analysis, sampling frame, conceptualization and operationalization of the variables, data sources, analytical methods, methodological rationale and overall design, which were used to draw firm conclusions on the hypotheses to be tested.

Units of Analysis

For the purposes of producing measures of technical efficiency, the circuit court is the unit of analysis. This approach is supported by prior research (Ostrom et al., 2000; Lewin, Morey and Cook, 1982). Because Florida's courts of general jurisdiction are organized into circuits, it would be inappropriate to use the county as the unit of analysis, despite the fact that methodologically it would be beneficial to increase the sample size and observations as Morey, Lewin and Cook (1982) did. Where needed, data were collected at the county level and aggregated into data at the circuit court level. Such an approach permits the data to be weighted by the county populations within the circuit.

In most prior research the focus has been on individual judges, appellate court panels, actors within the court system, case studies of a few courts and/or comparative studies of courts in different states. Few published works focus on circuits, though this is often how court systems are organized. This research compares Florida's overall circuits over time.

Sampling Frame

The sampling frame in this study covers the period of 1993 through 2008, which is delineated into subsets of the overall sampling frame that correspond with the enactment and the implementation of Revision 7: 1993-1997, 1998-2003 and 2004-2008. The year variable is conceptualized categorically to represent Revision 7 intervention dates: 1= [1993/94 to 1997/98]; 2= [1998/99 to 2003/04]; and 3= [2004/05 to 2007/08]. The data on the Florida circuit courts were available dating back to the 1986/87 fiscal year, but because of major discrepancies in the Fourth Circuit data those earlier years had to be excluded from the study. The discrepancies are no longer there from 1993/94 onward.

Data Sources

Court Data: The data were drawn from several important sources. The main source of the court data used to calculate court efficiency comes from the Summary Reporting System (SRS) maintained by the Florida state court system. The SRS is publicly available and allows for the retrieval of data from all courts in the Florida system with great research specificity by permitting searches based on: specific time frames of any length from 1986 through 2008; jurisdiction by county or circuit; and court type. A major strength of this data source is the ability during the data collection process to choose exact time frames. This work compiled the annual data based on the fiscal year (July-June). Drawing all data on court filings, dispositions, case types and outcomes from the SRS mitigates any problems inherent in attempting to acquire court data from counties or circuits directly, a topic explored at length by Sever and Reisner (2008).

The use of SRS data necessitates a disclaimer. The Office of State Court Administrators (OCSA) notes on the bottom of each SRS retrieval that the "data is not intended to be used as a measure of efficiency." However, in their state-funded research project comparing a Delphi-approach and a weighted caseload approach to certifying the need for new judgeships, Ostrom, Ostrom, Hall, Hewitt and Fautsko (2000) state that "one of the most important purposes of SRS data is for the certification of need for additional judgeships" (p. 22); these authors used and discussed SRS data at length. The present study is founded on the concept that efficiency should be measured as a part of the judicial need assessment. While SRS data in and of itself is acknowledged not to represent efficiency, it is crucial for determining technical efficiency and productivity.

Further research precedent for using and applying SRS data to the study of Florida's circuit courts is Ostrom, Strickland and Hannaford-Agor's (2004) use of SRS data in their 23-state analysis of state court trial trends, which included Florida. Carlson et al. (2008) not only cited SRS data but also noted that a state steering committee working on Revision 7 did so as well. The Florida Supreme Court (2009) used SRS data in a recent task force report dealing with the current foreclosure crisis in Florida. The Annual State Court Report (2003-2004) makes clear the value of these data:

> SRS data… includes case filings, cases processed by type, and analysis of clearance rate trends. This guide is essential for acquiring an overall view of judicial workload and is a descriptive resource for the courts and for stakeholders and decision makers outside the organizational structure of the courts. In recent years, the guide has served as an indispensable tool for assessing accountability

> internally and communicating the information externally. (p. 9)

This data source provides filing and disposition data that are used to create other statistics such as clearance rate, filings per judge and dispositions per judge. Clearly this is a valid data source widely used in prior research on the Florida courts.

Judgeships. The Florida State Court website (www.flcourts.org) provides several publications from which data on circuit court judgeships were compiled. The main publication used was the *Historical Judicial Certification Table*, which lists the number of judges requested, certified and authorized for each circuit for the years 1972-2008. The total judges per circuit for the years 1993-2008 was garnered from this source.

Population Data. The Florida Department of Law Enforcement's (FDLE) published annual reports provide all the data for this dissertation in terms of annual population figures.

Variable Conceptualization

Several variables had to be conceptualized for the study. For calculating the technical efficiency of circuit courts, prior studies were examined in terms of the inputs and outputs selected for analysis shown below in Table 3. At the end of this section Table 4 lists all variables for each analysis.

Table 3: Input and Output Measures of Previous Court Efficiency Studies

Author(s) & Year	Inputs	Outputs
Church, 1978	Total judges (criminal & civil); cases filed per judge	Dispositions per judge
Lewin, Morey and Cook, 1982	Size of caseload, number of DA's and assistants, days of criminal court held, number of misdemeanors in the caseload, size of the white population	Total number of dispositions, cases pending less than 90 days
Kittelson and Forsund, 1992	Number of judges, number of office staff	Number of civil cases, number of business cases, number of examination and summary judgment cases, number of ordinary criminal cases, number of registry cases, number of duress cases, number of probate and bankruptcy cases
Tulkens, 1993	Number of clerical staff (ranging from one to seven)	Number of settled civil and commercial cases, number of family arbitration hearings held, number of minor offense cases held
Pedraja-Chaparro and Salinas-Jimenez, 1996	Staff (workforce)	Cases resolved through entirety of process (sentences); cases resolved in other ways (withdrawals, dismissals, etc.)
Flango and Ostrom, 1999	Regression (DV): Number of judgeships	Regression (IV): Total filings
Beenstock and Haitovsky, 2004	Regression (IV): Total number of judges per court; total cases lodged; total cases pending	Regression (DV): Total cases completed
da Conceição Sampaio de Sousa and Schwengber, 2005	Number of judges, office staff and stock cases (new cases plus pending cases)	Civil cases, criminal cases, civil minor offenses, criminal minor cases, children and youth cases, criminal executions

Author(s) & Year	Inputs	Outputs
Schneider, 2005	DEA: Number of judges employed and the caseload per judge Regression (IV): promotion probability, age of judges under 60, share of judges with PhDs', new cases per judge, pending cases per judge, regional job loss rate	DEA: Number of finished cases and number of published decisions Regression (DV): DEA score for productivity, and a ratio of confirmed to published decisions

Inputs

The inputs for this study were carefully considered on the basis of the prior literature, the theoretical framework, the data available for the sampling frame being analyzed and the methodological approach. Total judges per circuit is the input measure for all three hypotheses. These measures are consistent with the data available and the previous studies of court efficiency reviewed (see Table 3 above). This input is further supported by the theoretical framework of this study as discussed with regard to the current debate: namely, that adding judges would enhance the productivity and efficiency of the courts, versus the opposing viewpoint that the number judges is appropriate to handle the workload of the courts. Moreover, this input is directly controllable through policy.

Outputs

Dispositions are the main quantifiable outputs of a court's work as well as the output most commonly used in previous research on court technical efficiency (see Table 3 above). Dispositions per judge for the entire circuit (criminal, civil and family courts) are used as the output measure. This output measures the volume of the court's work, dispositions, in relation to the total input of judgeships. It is in a sense what the court 'produces' per judicial input.

Control Variables

Control variables are an important part of the analytical framework, as they account for non-controllable factors that may affect court efficiency. All the control variables chosen have a basis in previous literature or established theory, are beyond the direct control of the courts and are postulated to affect efficiency outcomes. Each is discussed separately below.

To account for a change in workload, the percentage difference between the previous and the current year's filings is controlled for. It is important to control for workload changes in order to isolate the true impact of the Revision 7 policy intervention. This variable is measured as the year-over-year percent change in total court filings. If a court did not add judges but had an increase in circuit workload, this variable accounts for the efficiency variation that may result. Similarly, if a court increased its judgeships and saw a drop in filing inputs at the circuit level, this too is accounted for when analyzing the impact of Revision 7.

As part of the research design and methodology used over the full sampling frame, the baseline efficiency score from 1993/94 was used to control for court efficiency before the Revision 7 intervention. This variable is measured using the 1993-94 IOTA score from the first window of the DEA analysis.

Another important control variable is the clearance rate. Some research has called the filings not disposed the "court backlog" or "cases pending" (e.g. Beenstock and Haitovsky, 2004; Lewin, Morey and Cook, 1982). The NCSC uses the clearance rate as a measure of court efficiency since it is an input divided by an output. However, as an individual measure the problem with this ratio is that because of the time it takes a court to dispose of a case, there will be a backlog of cases within any given year due to the natural lag, which skews the clearance rate slightly. To overcome this problem, some research has created indices such as a backlog index calculated by the number of pending cases at the start of a year divided by the total dispositions of that year (Church, 1978), which in essence creates a "clearance ratio." Thus there is not operational continuity for this measure. A high clearance rate conceptually denotes the court clearing a greater number of pending cases in relation to its current year's dispositions, or increased productivity; a low rate signifies that the backlog is increasing relative to the percentage of court output. In fact, using the NCSC CourTools framework, the Massachusetts trial courts (Court Metrics Project, 2006) set an organizational goal to have a clearance rate of 110% to reduce backlog, demonstrating that this statistic has research as well as practical applicability. This measure is important to control for as the court processes and efficiency measure theoretically could be affected by the clearance rate. This work calculates clearance rate as the number of cases disposed divided by the number of filings for each year, but measures it as a year-over-year change rather than a static statistic.

The last variable to control for is the non-controllable judicial input of filings per judge. This variable was not included in the DEA analysis because of its high correlation ($r > .80$) with dispositions per judge, but it adds a crucial control for efficiency. In essence, this controls judge-specific and non-controllable court inputs and complements the percentage change in filings, which is a circuit level variable.

Table 4: Variables for Each Study Hypothesis

Hypothesis	Variables
H_1	*DEA* **Inputs:** Total Judgeships **Outputs:** Dispositions/Judge *Hierarchal Regression Analysis* **Independent:** Year (Continuous) **Dependent:** IOTA Score (Continuous) **Control:** Change in filings; Baseline IOTA Score; Change in Clearance Rate; Filings Per Judge; Circuit Population (all continuous measures) *Analysis of Variance* **Independent:** Revision 7 Period (Categorical) **Dependent:** IOTA Score (Continuous) **Control:** Change in filings; Baseline IOTA Score; Change in Clearance Rate; Filings Per Judge; Circuit Population (all continuous measures)
H_2	*Analysis of Variance and Covariance* **Independent:** Revision 7 Period (Categorical); Circuit Size (Categorical) **Dependent:** IOTA Score (Continuous) **Control:** Change in filings; Baseline IOTA Score; Change in Clearance Rate; Filings Per Judge (all continuous measures)
H_3	*MPI* **Inputs**: Total Judgeships **Outputs**: Dispositions/Judge *Hierarchal Regression Analysis* **Independent:** Judges Added (Continuous) **Dependent:** TFPCH (Continuous) **Control:** Filings/Judge; Change in Clearance Rate (both continuous measures) *Analysis of Variance and Covariance* **Independent:** Judges Added (Categorical); Revision 7 Period (Categorical); Circuit Size (Categorical) **Dependent:** TFPCH (Continuous) **Control**: Filings/Judge; Change in Clearance Rate (both continuous measures)

Variable Operationalization

Exogenous Variables

H_1: the input is total circuit judgeships (DEA); the year (continuous, categorical) is exogenous since it is expected to predict increased efficiency in the overall circuit courts.

H_2: the exogenous variables are the categorical year (measured as the Revision 7 policy intervention periods) and categorical circuit size (small, medium and large).

H_3: the input measure is the total circuit judgeships; the number of judges added (measured both continuously and categorically) is exogenous and predicts the change in productivity; categorical year (measured by Revision 7 policy interventions) and categorical circuit size (small, medium and large) are also exogenous variables.

Endogenous Variables

H_1: the output measure is dispositions per judge; the IOTA score is the endogenous variable since efficiency scores should be impacted by Revision 7 intervention periods (before, during and after Revision 7).

H_2: the endogenous measure is IOTA score.

H_3: the output measure is dispositions per judge per circuit; the endogenous variable is the change in productivity from the prior year (TFPCH).

Control Variables

H_1: the controls are the year-to-year change in circuit filings (measured as the percentage change, continuous); the clearance rate change year-over-year (measured as a percentage, continuous); the baseline efficiency score pre-intervention (measured as the 1993/94 IOTA score per circuit); circuit population and the filings per judge.

H_2: the controls are the year-to-year change in circuit filings (measured as the percentage change, continuous); the clearance rate change year-over-year (measured as a percentage, continuous); the baseline efficiency score pre-intervention (measured as the 1993/94 IOTA score per circuit); and the filings per judge.

H_3: filings per judge and the clearance rate change.

Analytical Methods

Several methods are employed in the study: 1) DEA; 2) two-stage DEA using hierarchal regression analysis and analysis of covariance; and 3) Malmquist Productivity Index. Each is discussed separately below.

H_1: Florida's circuit courts are relatively more efficient since the implementation of Revision 7 (2004/05-2007/08) than they were after its passage (1998/99-2003/04) or before either (1993/94-1997/98), controlling for other factors.

DEA is an appropriate technique for determining the relative technical efficiency of public organizations (Nyhan, 2002; Nyhan and Martin, 1999; Camanho and Dyson, 1999;

Athanassopoulos and Curram, 1996; Ludwin and Guthrie, 1989); it meets the suggestion of Ostrom and Hanson (1999) that court efficiency studies use a "productivity frontier" approach that can apply to entire systems, processes or court actors. In the following paragraphs, DEA is discussed in general and the specific problems and issues raised in the literature are noted. This section concludes by specifying the methodology of this study.

DEA is a methodology that can compare decision-making units (DMU's) based on their respective resource utilizations to achieve a certain output relative to their input levels (Lewin and Minton, 1986; Farrell, 1957). This methodology produces a single score of relative DMU efficiency from assigned inputs and outputs to identify a most efficient performer among the sample against which the performance of others can be gauged (Camanho and Dyson, 1999). DEA has the advantage of identifying sources of the inefficiencies between comparable decision-making units, which is necessary for setting targets or benchmarks (Thanassoulis, 1993) based on Pareto-optimality (Nyhan, 2002; Nyhan and Martin, 1999). DEA also can be modified to use panel data over time and be used to analyze efficiency variation (Athanassopoulos and Curram, 1996). Therefore DEA is directly appropriate to the topic, the literature, the theoretical framework and the hypotheses being tested.

One challenge in the use of DEA is to select appropriate inputs and outputs within a valid, identified theoretical framework (Nyhan and Martin, 1999). Nearly all the literature on DEA notes the work of Farrell (1957) as a pioneer of this methodology. Farrell admits that it is more complex to base efficiency analysis on theory rather than observable process. The present study combines theory and process to enhance the overall validity of the research design and conclusions reached. A thorough review was made of the known published studies of court efficiency that have used DEA, to examine how inputs and outputs were selected. This study uses inputs and outputs rooted in prior studies, a current policy debate and established organizational and systems theories to analyze the technical efficiency of Florida's court system. Furthermore, observations must be of comparable units, which circuits within a single system are. In these terms, the study has face validity for its DEA methodologies (Nyhan and Martin, 1999).

Another issue with DEA concerns the sample size of the observations. Pedraja-Chaparro, Salinas-Jiminez and Smith (1999) note requirements in the literature for a sample size of at least three times the combined total of inputs and outputs. A sample size range of 4-15 observations per independent variable (or input) is suggested by Nyhan and Martin (1999). This study has a per-year sample size of 20 circuits with two combined inputs and outputs, exceeding the minimum standard levels for DEA stated above. Sample size is therefore not an issue for the study design, especially when the circuits are pooled.

For the hypotheses being tested DEA is output-oriented, based on varying returns to scale (VRS or BCC). VRS or BCC orientation is used because this work takes the position that a certain factor's effects on court efficiency mean that constant returns to scale cannot be assumed analytically. Furthermore, Beenstock and Haitovsky (2004), after reviewing the literature, based their judicial productivity study on the *a priori* presumption that judges do not maximize utility or productivity to the point that adding more judges had the effect of decreasing output. It would not be sound in the context of this study to assume otherwise. The output orientation focuses on increasing output given the current input levels provided, a perspective relevant to the current policy debate.

Several variants of DEA are used to test the study hypotheses. The first is a pooled DEA analysis in which all 20 circuits for 15 years are analyzed as separate DMU's (N = 300). This methodology has been suggested and employed in other court efficiency studies (Schneider, 2005; Beenstock and Haitovsky, 2004; Pedraja-Chaparro and Salinas-Jiminez, 1996; Kittelson and Forsund, 1992) as preferable to a panel or cross-sectional approach. Consistently, with the research questions here, pooled DEA analysis permits comparison over time both within and between circuits while providing an IOTA score for each DMU that can be integrated with parametric methodologies.

Two-stage DEA combines DEA results with other methodologies (Nyhan and Martin, 1999) to calculate both efficiency as well as its theorized determinants (Varman, 2008). DEA has been found to be a better methodology than either OLS regression or ratio analysis alone to assess the technical efficiency of DMU's (Nyhan and Martin, 1999; Thanassoulis, 1993; Ludwig and Guthrie, 1989). Hierarchal regression analysis was utilized to assess the impact of Revision 7 on court efficiency while controlling for other factors that may also efficiency outcomes, thus isolating the contribution of time in explaining the variability of IOTA scores. This method also identifies the explanatory contributions to circuit court efficiency of each control variable as well as the group of control variable. Furthermore, one-way ANCOVA was used to compare IOTA scores between three distinct time periods (pre-Revision 7, post-enactment/pre-intervention and post-intervention) while holding other factors constant.

H_2: Efficiency changes over the time periods related to Revision 7 will not be consistent for all circuit sizes.

Supplementing this analytical framework is the addition of a two-way ANCOVA procedure, which tests IOTA scores by categories of years that correlate with Revision 7 intervention periods while controlling for other factors that could affect efficiency. This is a robust and effective method of determining whether IOTA score is related to specific intervention periods as hypothesized, and whether or not there is a significant interaction effect between circuit size and time period, while controlling for other factors.

This methodology is based upon a 3 x 3 contingency table, expressed as:

Table 5: 3 x 3 Contingency Table of IOTA Score, Revision 7 Period and Circuit Size

Period 1: Small Circuits	Period 2: Small Circuits	Period 3: Small Circuits
Period 1: Medium Circuits	Period 2: Medium Circuits	Period 3: Medium Circuits
Period 1: Large Circuits	Period 2: Large Circuits	Period 3: Large Circuits

H_3: Increasing judgeships at the system or circuit level reduces productivity.

The third and final DEA method used in this study is the creation of a Malmquist Productivity Index (MPI) over the full time span. Caves, Christensen and Diewert (1982) are credited with using the ideas of Malmquist (1953) to create a productivity index that permits varying returns to scale from either an input or output perspective. Similar to DEA, the output-based Malmquist Index calculates productivity levels in terms of the maximum output for specified levels of input (Caves et al., 1982). The MPI looks at the circuits from both a panel (cross-sectional) and pooled (time series) perspective, providing evidence of technical efficiency and productivity changes over specified time periods (Sufian and Majid, 2009). This methodology has been used in previous research on court efficiency (Kittelson and Forsund, 1992) as well as in many other fields studying both private and public entities. Whereas the pooled DEA approach compares all DMU's in the analysis against each other, the MPI analyzes year over year productivity change, decomposed as efficiency change (EFFCH) and technical change (TECHCH). Thus, productivity change is a result of both the changes to efficiency (both technical and scale) and to technical change, or innovation (Barros, Barroso and Borges, 2005; Umetsa, Lekprichakul and Chakravorty, 2003). This model analyzes the input-output relationship of judges and dispositions as a function of time periods as well as over the entire time period of study for the system.

This methodology is also output-oriented and includes the same variables as the earlier DEA results in order to test the third hypothesis. Again, a regression analysis was used to determine the extent of the relationship between adding judgeships and productivity outcomes. Furthermore, two-way analysis of variance was used to test the interaction of judges added, circuit size and policy intervention period with regards to change in productivity outcomes.

CHAPTER FOUR: RESULTS FROM THE ANALYSIS OF CIRCUIT COURTS, 1993/94 THROUGH 2007/08

This chapter provides the statistical results for the hypotheses that test whether increased overall circuit court efficiency is dependent on the intervention dates of Revision 7, controlling for other factors; whether this difference is consistent across circuit sizes; and whether increasing judgeships lowers productivity. This chapter includes an overview of the data, a full presentation of the pooled DEA results, the hierarchal regression results, the ANOVA and ANCOVA results and the results of the Malmquist Productivity Index.

Overview of the Dataset: Circuit Courts from 1993 to 2008

Below is an overview of the changes throughout the Revision 7 policy cycle to the input and output measures used in the DEA that follows. Table A in the Appendix displays the full data for all circuits from 1993 to 2008.

Judges

Over the span of time leading to the passage of Revision 7 (1993/94 to 1997/98), 34 judges in total were added to the Florida system. According to the Judicial Certification Chart, the judicial branch had requested 61 additional judgeships. Thus, the additional judges represented a little more than half (55%) of what the judiciary had requested over this time. Over the span of the next six-year period (1998/99 to 2003/04), a total of 59 new judges were added for an average of 2.95 new judges per circuit. The courts had requested 190 judgeships and obtained 31% of their request. After implementation of Revision 7 (2004/05 to 2007/08), 72 new judges were added, the largest judicial increase of any of the time periods in the study despite it having been the briefest. This equates to roughly 3.6 new judges per circuit in the aggregate. The judiciary had requested 191 new judges, a success rate of 37.6%.

Over the span of Revision 7, the number of judges increased 38% (434 to 599) or by 165 judges. The judicial branch had requested 442 more judges which would have nearly doubled the number of judgeships in Florida over that 15-year period. Rather, the state allocated 37% of the judgeships requested. Had the requested judgeships been granted, in 2007/08 there would have been 876 judges, an average of 43.8 judges per circuit.

Dispositions

Judges in 1993/94 disposed of 1337.6 cases each on average, increasing that to 1363.2 dispositions per judge by 1997/98, or roughly 25.6 more outputs per judge. In 1993/94, the Ninth Circuit had the highest outputs (1770.15) per judge in Florida. By 1997/98, the Second Circuit was highest in outputs per judge (1555.17). These highs contrast with those at the other end of the spectrum. In 1993/94, the Sixth Circuit produced a low of 1,153.97 outputs per judge. By 1997/98, the Sixteenth Circuit and its same four judge total had the lowest outputs per judge: 940. Eleven circuits saw increases in dispositions per judge over this period, ranging from the lowest increase of +10.32 (Thirteenth Circuit) to the highest of the Third Circuit (+326.60). Nine circuits experienced decreases in dispositions per judge, ranging from -2.88 (Eleventh Circuit) to

-339.37 (Fourteenth Circuit). These early data begin to show some potential for input/output variability both within and between circuits over time.

In contrast to the earlier time period, dispositions per judge within the aggregate system also decreased by -104.54 (1440.58 to 1336.04) from 1998/99 to 2003/04. Once again, the differences varied within circuits as well. Eleven circuits saw decreases in the dispositions per judge, ranging from -51.64 (Fifteenth Circuit) to -449.67 (Second Circuit) over this time period, while nine circuits increased their output, ranging from +1.89 per judge (Eleventh Circuit) to +171.44 (Fourteenth Circuit). In terms of outputs, eight circuits produced more dispositions per judge in 2003/04 than in 1993/94, with differences ranging from an increase of +8.86 (Thirteenth Circuit) to +191.36 (First Circuit). Twelve circuits showed a decline ranging from -7.28 dispositions per judge (Eleventh Circuit) to -402.04 (Ninth Circuit). Two other circuits (Eighth and Sixteenth) had declines greater than 300 dispositions per judge as well. These findings are consistent with the earlier literature in that adding judges reduces inputs and outputs per judge.

In terms of output between 2004/05 and 2007/08, the difference between the time periods shows a more subtle increase (1,314.11 to 1,340.6, respectively). As inputs increased, average dispositions per judge held steadier in the aggregate. Two circuits (the Twentieth and Ninth) had more than 1,500 dispositions per judge by 2007/08. However, output variation was unequal across this time period. Nine circuits increased their dispositions per judge (ranging from +5.4 to +168.28), and eleven circuits showed declines (ranging from -6.15 to -178.41).

Interestingly, the top output year for the court in terms of dispositions per judge was 1998/99, a Revision 7 transition year, with a system mean of 1440.58 (n=674,192). Within circuits, there were nine circuits that experienced increases in dispositions per judge over the life cycle of Revision 7, ranging from +14.64 (Eleventh Circuit) to +218.03 (Seventeenth Circuit). The remaining eleven circuits experienced decreases in output ranging from -7.31 (Fourth Circuit) to -369.61 (Eighth Circuit).

This section described input and output data for the Florida circuit courts from 1993 through 2008 relative to Revision 7 intervention dates. Next, the technical efficiency of the circuits will be analyzed within the same context.

Efficiency Analysis

DEA Results

The DEA results (Table 6 below) reveal that only 3 of 300 DMU's (1%) rated as technically efficient (1.0). This differs significantly from prior court research, as 63.3% of North Carolina district criminal courts (Lewin, Morey and Cook, 1982), 57% of Brazilian courts (da Conceição Sampaio de Sousa and Schwengber, 2005); 23.8% of Spanish High Courts (Pedraja-Chaparro and Salinas-Jimenez, 1996) and 15.2% of Belgian Justice of the Peace courts (Tulkens, 1993) were rated as technically efficient. Two of the three technically efficiency Florida courts were from the first year of the study (Ninth and Sixteenth Circuits), and the other was in 1998/99 (Third Circuit). The overall mean IOTA score over the policy cycle of Revision 7 was .756 (.78, .76, and .72 by respective time frames). Once again, this mean is much lower than those found in previous research: .967 for 30 North Carolina criminal circuit courts in 1976 (Lewin, Morey and Cook, 1982); the means for Norwegian diversified courts, city courts and district courts each at .95 (Kittelson and Forsund, 1992); and the .888 mean for German Labor Appeals courts

(Schneider, 2005). Though these comparisons suggest a baseline measure, none is generalizable to the current Florida court system.

The general trend in technical efficiency outcomes in this study is that they peaked in the aggregate system in the year that Revision 7 was enacted and then declined until 2006/07 before increasing in 2007/08. This is highlighted by the finding that the mean system IOTA score was .78 in 1993/94 and .68 in 2006/07 (see Figure 1 below).

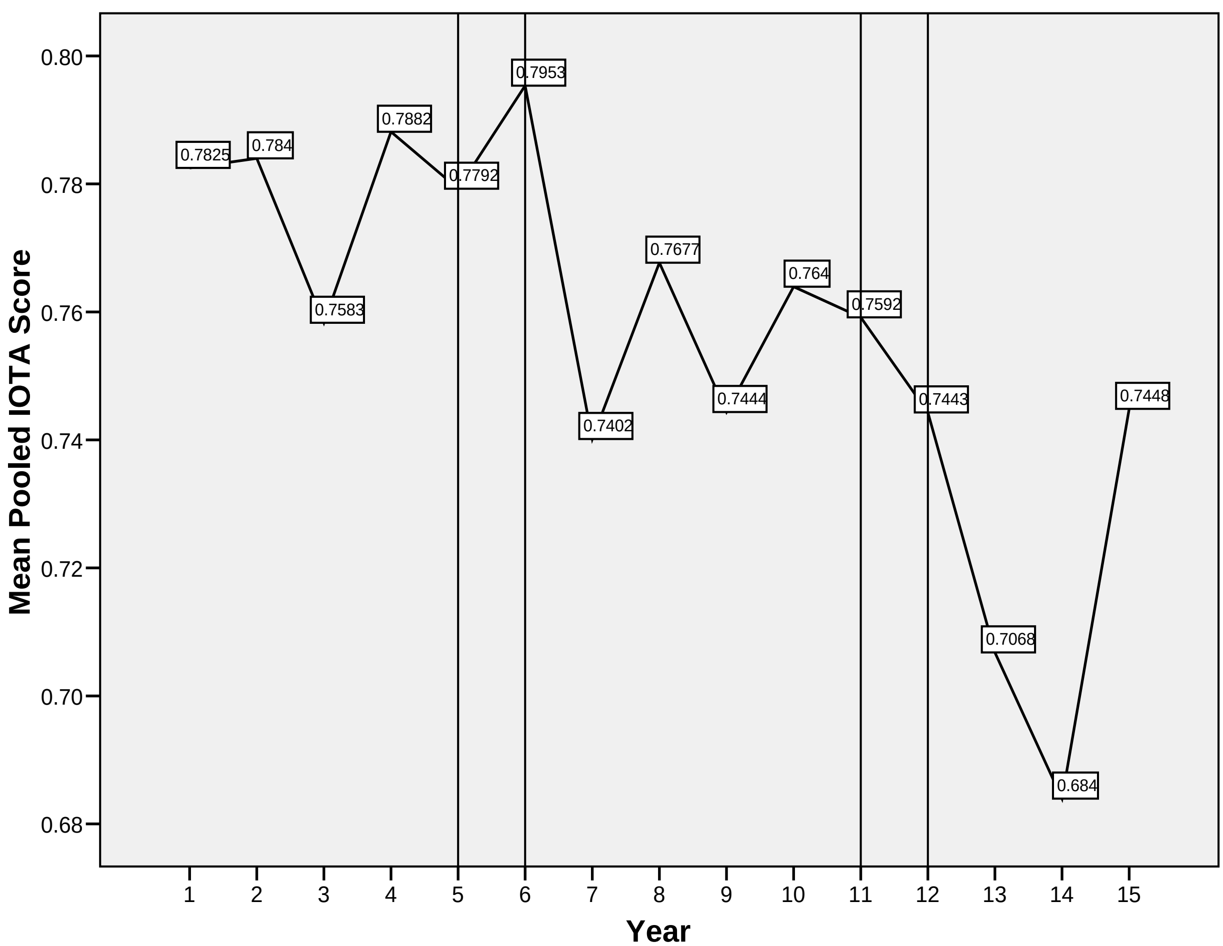

Figure 1: Mean System IOTA Score per Year, 1993/94- 2007/08

In addition to the systemic variability of efficiency outcomes there were variabilities within and between circuits as well. Seven of twenty circuits saw a positive change in IOTA scores between 1993/94 to 2007/08 ranging from +.01 to +.12; the remaining thirteen circuits displayed decreases in IOTA scores ranging from -.01 to -.20. Between circuits, the Ninth Circuit had the highest overall mean IOTA score over the life cycle of Revision 7 (.86), and the lowest overall mean IOTA score was .70 (Fifteenth and Eighteenth Circuits).

Figure 2 delineates IOTA scores by categorical circuit size (small, medium, and large). In 1993/94, the highest IOTA scores belonged to the smallest circuits (.822), followed by the medium sized circuits (.787), then the large circuits (.744). By the time Revision 7 was enacted, small circuits were still the most efficient (.837), but the large circuits had overtaken the medium sized circuits (.781 to .775), though both were nearly equivalent on average. By the time Revision 7 was implemented, medium sized circuits were the most efficient (.765), followed by large (.74) then small circuits (.724). Between enactment and implementation, small circuits had the greatest decrease in mean efficiency scores. By 2007/08, large circuits were the most efficient (.77), followed by medium sized (.756) and small (.703) circuits. Over the full policy cycle, large circuits increased their mean IOTA score (.744 to .77), medium-sized circuits had a small decrease (.787 to .756) and small circuits had a larger decrease (.822 to .703).

These DEA results show clear inefficiencies within the system over time and expose variability in efficiency outcomes both within and between circuits. To determine whether this variability is a function to the Revision 7 policy intervention, hierarchal regression analysis and analysis of co-variance tests were conducted. The results follow.

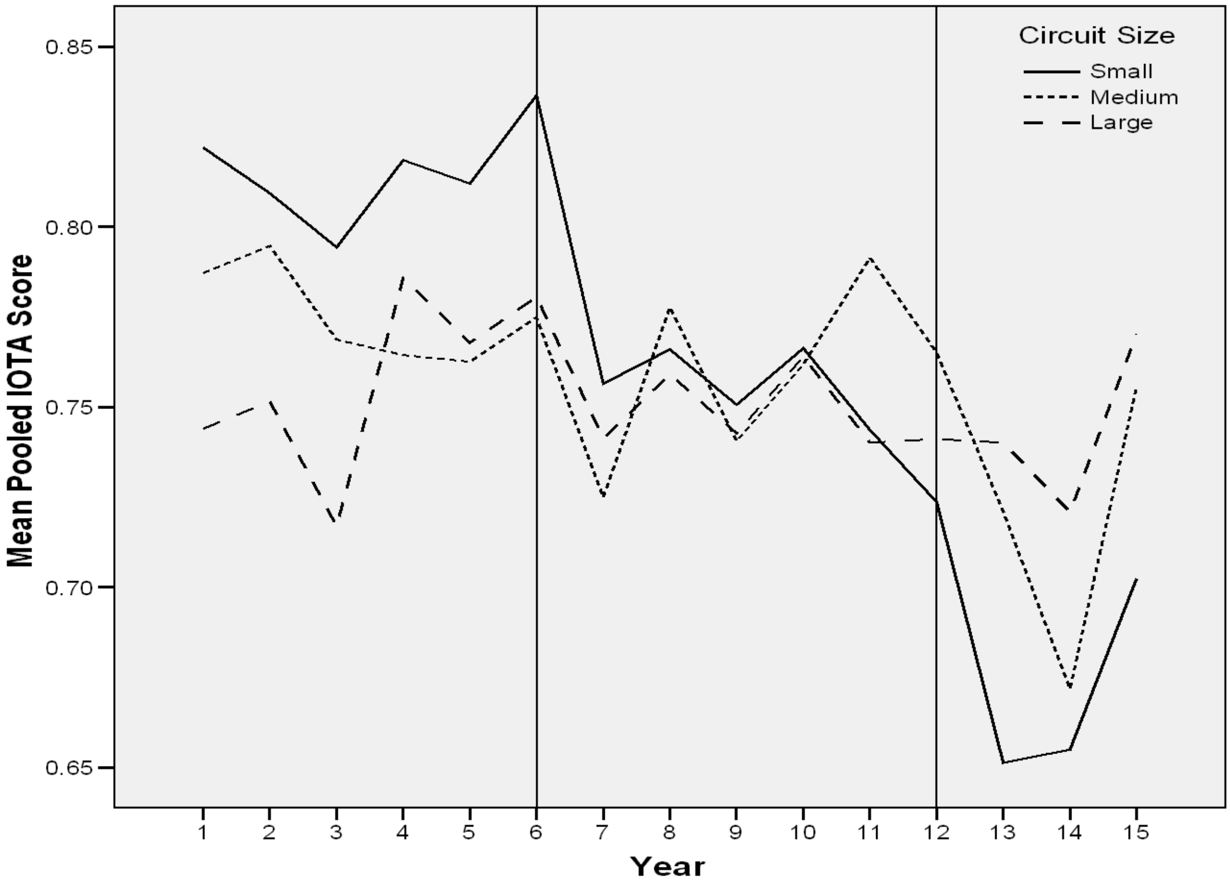

Figure 2: Mean System IOTA Score by Year and Categorical Circuit Size, 1993/94-2007/08

Table 6: Pooled DEA Results for Circuit Courts by Year, 1993/94-2007/08

Circuit	1993/94	1994/95	1995/96	1996/97	1997/98	**1998/99**	1999/00	2000/01	2001/02	2002/03	2003/04	**2004/05**	2005/06	2006/07	2007/08	MEAN	Diff
1	0.73	0.82	0.82	0.76	0.76	0.80	0.77	0.79	0.79	0.84	0.84	0.81	0.76	0.73	0.75	0.79	+.02
2	0.73	0.80	0.77	0.95	0.88	0.92	0.75	0.74	0.63	0.70	0.66	0.63	0.58	0.60	0.59	0.73	-.14
3	0.68	0.70	0.73	0.85	0.86	1	0.82	0.69	0.67	0.74	0.77	0.71	0.60	0.63	0.67	0.74	-.01
4	0.71	0.76	0.71	0.75	0.73	0.82	0.70	0.72	0.69	0.75	0.69	0.71	0.77	0.69	0.70	0.73	-.01
5	0.83	0.82	0.78	0.84	0.76	0.77	0.73	0.80	0.79	0.75	0.82	0.81	0.80	0.72	0.78	0.79	-.05
6	0.65	0.67	0.64	0.78	0.73	0.70	0.69	0.71	0.67	0.74	0.72	0.73	0.70	0.72	0.74	0.71	+.09
7	0.81	0.83	0.81	0.83	0.72	0.72	0.70	0.76	0.70	0.72	0.76	0.75	0.72	0.68	0.71	0.75	-.10
8	0.84	0.82	0.87	0.84	0.86	0.81	0.77	0.82	0.75	0.79	0.67	0.69	0.62	0.63	0.63	0.76	-.21
9	1	0.99	0.88	0.92	0.87	0.81	0.78	0.81	0.80	0.77	0.77	0.82	0.89	0.83	0.90	0.86	-.10
10	0.79	0.82	0.81	0.72	0.79	0.84	0.78	0.85	0.81	0.79	0.78	0.80	0.70	0.66	0.70	0.78	-.09
11	0.74	0.74	0.71	0.81	0.74	0.74	0.74	0.76	0.77	0.73	0.74	0.71	0.70	0.69	0.75	0.74	+.01
12	0.75	0.69	0.73	0.72	0.78	0.81	0.72	0.71	0.62	0.70	0.76	0.71	0.69	0.65	0.77	0.72	+.02
13	0.77	0.76	0.77	0.77	0.77	0.82	0.77	0.80	0.77	0.83	0.77	0.83	0.83	0.74	0.75	0.78	-.02
14	0.88	0.80	0.73	0.70	0.69	0.75	0.69	0.71	0.80	0.83	0.84	0.81	0.75	0.69	0.77	0.76	-.11
15	0.66	0.63	0.61	0.69	0.71	0.75	0.74	0.74	0.71	0.70	0.72	0.67	0.65	0.69	0.75	0.70	+.09
16	1	0.87	0.80	0.78	0.74	0.68	0.84	0.95	0.93	0.83	0.76	0.73	0.73	0.73	0.80	0.81	-.20
17	0.68	0.72	0.70	0.78	0.82	0.82	0.78	0.79	0.78	0.83	0.77	0.71	0.66	0.71	0.80	0.76	+.12
18	0.82	0.78	0.70	0.72	0.76	0.73	0.65	0.73	0.68	0.66	0.76	0.64	0.64	0.60	0.69	0.70	-.13
19	0.81	0.87	0.87	0.79	0.85	0.87	0.67	0.69	0.71	0.71	0.76	0.78	0.63	0.64	0.78	0.76	-.03
20	0.78	0.81	0.73	0.77	0.76	0.75	0.74	0.82	0.80	0.87	0.82	0.84	0.76	0.66	0.89	0.79	+.10
ALL	0.78	0.78	0.76	0.79	0.78	0.80	0.74	0.77	0.74	0.76	0.76	0.74	0.71	0.68	0.75	0.76	-.03
Range	.66-1.0	.63-.99	.61-.88	.69-.95	.69-.88	.70-1.0	.65-.84	.69-.95	.62-.93	.66-.87	.66-.84	.63-.84	.58-.89	.60-.83	.63-.90	.70-.86	

Correlation Analysis

The analytical methods employed in this chapter require a careful analysis of the correlation between the independent variables and between the dependent and control variables. As shown below in Table 7, none of the dependent variables has a correlation coefficient greater than r = .80, meaning none had to be removed from the analyses that follow for that reason. Furthermore, four of the five control variables are significantly correlated with the dependent variable, IOTA score. Only one, the percentage change in filings, is not significantly correlated (r = .109, p=.059) and will be removed from the analysis. The correlation analysis also revealed that baseline efficiency score is not strongly correlated to IOTA score (r = .381), meaning that there have been efficiency changes within circuits over the policy span of Revision 7. Additionally, the correlation between circuit size and IOTA score is significant (p = .044) but weak (r = -.116). The strongest correlation in the analysis is between filings per judge and IOTA score (r = .607), which suggests that as filings per judge increases, so do efficiency outcomes, a finding consistent with the hypothesis being tested that constraining judicial resources such as judgeships correlates with higher workload and efficiency. Furthermore, there is a significant correlation (r = -.297, p = .000) between the year variable and IOTA score in the sample. As the years rise through the policy cycle, the IOTA scores are lower.

When the correlation analysis is delineated by categorical circuit size (small, medium or large), the correlation between the year and IOTA score is still significant in small circuits (r = -.531, p = .000) and medium-sized circuits (r = -.298, p = .002) but not the large circuits (r = -.04, p = .683), which is consistent with the earlier findings on circuit size differences. The continuous measure of circuit population masks this finding. Added to this finding is the fact that small circuit IOTA scores are weakly yet significantly correlated with the baseline IOTA measure in 1993/94 (r = .247, p = .019) while medium circuits show no significant correlation between these variables (r = -.077, p = .436), and large circuits show a strong and significant correlation (r = .704, p = .000).

Table 7: Correlation Analyses of Variables for First Two Hypotheses

		CIRCPOP	FILJUDGE	PERCHFIL	PERCHCLEAR	BASEIOTA	YEAR	IOTA
CIRCPOP	Pearson Correlation	1						
	Sig. (2-tailed)							
FILJUDGE	Pearson Correlation	.081	1					
	Sig. (2-tailed)	.162						
PERCHFIL	Pearson Correlation	.129	.543	1				
	Sig. (2-tailed)	.025	.000					
PERCHCLEAR	Pearson Correlation	-.069	-.143	-.452	1			
	Sig. (2-tailed)	.232	.013	.000				
BASEIOTA	Pearson Correlation	-.346	.058	-.029	-.008	1		
	Sig. (2-tailed)	.000	.314	.616	.893			
YEAR	Pearson Correlation	.159	-.053	.249	-.130	.000	1	
	Sig. (2-tailed)	.006	.356	.000	.025	1.000		
IOTA	Pearson Correlation	-.116	.607	.109	.264	.381	-.297	1
	Sig. (2-tailed)	.044	.000	.059	.000	.000	.000	

CIRCPOP=Circuit Population; FILJUDGE=Filings per Judge; PERCHFIL=Percentage Change in Filings Year over Year; PERCHCLEAR=The Change in Clearance Rate Year over Year; BASEIOTA=The Baseline IOTA Score from 1993/94; YEAR=Year of Study (1-15); IOTA=Pooled IOTA score for 300 DMU's. N=300.

Hierarchal Regression Analysis Results for Technical Efficiency

Regression analysis was used to determine how much of the variance in IOTA score is explained by the year variable, controlling for total circuit population, filings per judge, the clearance rate difference year-over-year and the baseline IOTA score from 1993/94, all of which were significantly correlated with IOTA score. The correlation analysis reveals a significant and weakly negative correlation between the year and the IOTA score in the full sample. Below are the results for the hierarchal regression analysis output in Table 7.

The first step in regression analysis is testing the assumptions that must be present to obtain conclusive results (see Appendix C for full assumption results). The assumptions for this model have been met relative to normality, multicollinearity, independence of errors and linearity.

The assumption of normality is met visually according to the scatterplot and histogram of the residual. The skewness of the dependent variable slightly exceeds optimal standards (.437/.141 = 3.1) as does the kurtosis statistic (.700/.281 = 2.5). In terms of outliers, the Mahalanobis Distances revealed 14 values of 300 observations (4.6%) to be above the critical value threshold. The output, set at detecting residual outliers greater than +/- 2 σ found 10 values (3.3%). There were three residual values greater than +/- 3.3 (1%) and no Cook's values that exceeded .14, with the threshold of less than 1.0 suggesting that these outliers do not influence the results strongly. These results, when analyzed in totality, suggest that the assumption of normality has been met.

This model did not violate the assumption against multicollinearity, as no independent variables have correlation coefficients greater than .70 (see Table 8, p. 78); VIF scores are all less than 10 and tolerance levels for all variables are greater than .10 (see Table 8, p. 78).

The model did not violate the assumption against autocorrelation or independence of error, as the Durbin-Watson statistic is 1.928, almost midway between the acceptable threshold of 1-3. In addition, each observation appears only once in the analysis.

Linearity is met through visual inspection of the P-P plot (see Appendix C).

The initial model contained all the control variables as a block. This model is significant (F = 117.024, p = .000) and explains 61.4% of the variance of IOTA scores. The second model controlled for the contribution of these variables and included the year as a predictor of IOTA score. This model is also significant (F = 114.718 p = .000). Though the year variable is significant in its contribution to IOTA score variance (p = .000, t = -6.409), it uniquely explains just 4.7% of the variance of IOTA score while controlling for other factors. Thus the second model explains 66.1% of the variance in IOTA score, but only 4.7% was explained by the year. The standardized regression coefficient (β = -.223) confirms the directionality of this relationship. In the full sample, controlling for other factors, there is very weak evidence that the year of study produces higher IOTA scores when measured continuously. In fact, scores appear to decrease as time increases.

For specificity, two-way ANOVA and ANCOVA models analyzed the main effects of time period (pre-Revision 7, post-enactment but pre-implementation, and post-implementation) and circuit size (small, medium, and large) on IOTA outcomes as well as the interaction effect of the two variables. Those results are presented in the following section.

Table 8: Hierarchal Regression Analysis Output of IOTA Score by Year

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	D-W
1	.783[a]	.614	.609	.04614	.614	117.204	4	295	.000	
2	.813[b]	.661	.655	.04330	.047	41.080	1	294	.000	1.928

a. Predictors: (Constant): FILJUDGE, BASEIOTA , PERCHCLEAR, CIRCPOP

b. Predictors: (Constant): FILJUDGE, BASEIOTA , PERCHCLEAR, CIRCPOP, YEAR

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.998	4	.250	117.204	.000[a]
	Residual	.628	295	.002		
	Total	1.626	299			
2	Regression	1.075	5	.215	114.718	.000[b]
	Residual	.551	294	.002		
	Total	1.626	299			

a. Predictors: (Constant), Filings Per Judge, Baseline IOTA Score from 1993/94 , Change in the Year Over Year Clearance Ra Total Circuit Population

b. Predictors: (Constant), Filings Per Judge, Baseline IOTA Score from 1993/94 , Change in the Year Over Year Clearance Ra Total Circuit Population, Year

c. Dependent Variable: Pooled IOTA Score

		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B		Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.158	.033		4.835	.000	.094	.223					
	CIRCPOP	-3.93E-009	.000	-.027	-.693	.489	.000	.000	-.116	-.040	-.025	.867	1.153
	PERCHCLEAR	.466	.048	.356	9.724	.000	.372	.560	.264	.493	.352	.976	1.025
	BASEIOTA	.262	.030	.337	8.701	.000	.203	.321	.381	.452	.315	.873	1.146
	FILJUDGE	.000	.000	.640	17.390	.000	.000	.000	.607	.711	.629	.967	1.034
	YEAR												
2	(Constant)	.187	.031		6.032	.000	.126	.248					
	CIRCPOP	1.95E-009	.000	.013	.360	.719	.000	.000	-.116	.021	.012	.842	1.188
	PERCHCLEAR	.428	.045	.327	9.442	.000	.339	.517	.264	.482	.321	.959	1.042
	BASEIOTA	.274	.028	.352	9.663	.000	.218	.329	.381	.491	.328	.869	1.151
	FILJUDGE	.000	.000	.620	17.875	.000	.000	.000	.607	.722	.607	.959	1.043
	YEAR	-.004	.001	-.223	-6.409	.000	-.005	-.003	-.297	-.350	-.218	.950	1.053

Analysis of Variance Results for Technical Efficiency

The ANOVA results provide conclusive responses to the first two hypotheses directly. The analysis was conducted on the framework of a 3 x 3 contingency table. All assumptions of ANOVA and ANCOVA were analyzed (see Appendix C) beyond those required for the above regression analysis. Each will be discussed within the framework of the model below for which it is applicable.

Table 9 presents the descriptive statistics by category (intervention period and circuit size). Table 10 presents the results from the two models.

Table 9: Mean IOTA Scores by Categorical Circuit Size and Intervention Period

Circuit Size	Year	Mean IOTA Score	σ	N
Small	1993/94-1997/98	.8112	.07679	30
	1998/99-2003/04	.7699	.08798	36
	2004/05-2007/08	.6831	.07090	24
	All	.7606	.09371	90
Medium	1993/94-1997/98	.7755	.04232	35
	1998/99-2003/04	.7619	.05741	42
	2004/05-2007/08	.7284	.06658	28
	All	.7575	.05814	105
Large	1993/94-1997/98	.7533	.09105	35
	1998/99-2003/04	.7546	.04411	42
	2004/05-2007/08	.7431	.06788	28
	All	.7511	.06854	105

Table 10: ANOVA and ANCOVA Results for IOTA Score Outcomes

Model	R^2	Levene's Statistic	Variable	F-value	Sig.	Partial Eta^2	Power
1 Two-way ANOVA	.164	.001	Circuit Size	.159	.853	.001	.074
			Article V Period	18.773	.000	.114	1.0
			Interaction	5.580	.000	.071	.977
2* Two-way ANCOVA	.683	.000	Circuit Size	3.988	.020	.027	.711
			Article V Period	22.005	.000	.133	1.0
			Interaction	3.484	.008	.046	.858

*controlling for baseline IOTA score, clearance rate difference and filings per judge

The first model, a two-way analysis of variance, had a Levene's statistic of .001, meaning that the error variance of the IOTA score was not equally distributed across all groups, violating the ANOVA assumption. To overcome this violation, the Tamhane's 2 statistic was utilized to interpret the post-hoc test results. The pooled IOTA score was normally distributed. The observations are also independent as the DEA was pooled with each DMU representing a single observation. This model found no significant IOTA score differences in categorical circuit size (F = .159, p = .853) but found significant differences by Revision 7 period (F = 18.773, p = .000, P = 1, d = .114). The post-hoc tests found no significant difference (p = .056) in mean IOTA score between the pre-enactment period (.78) and the post-enactment, pre-implementation period (.76). The post-implementation period is significantly lower (p = .000) than both earlier time periods (.718). The effect size of this intervention is small (d = .11). There is a significant interaction effect between circuit size, Revision 7 period and IOTA score as well (F = 5.580, p = .000, P = .977, d = .071). This interaction occurs in the period between enactment and implementation, with small and medium-sized circuits having lower IOTA scores than the large circuits.

The second model used a two-way ANCOVA design controlling for the baseline IOTA score from 1993/94, the clearance rate difference year over year and filings per judge. The former variable is a statistical control for efficiency outcomes before the policy intervention while the latter variables were based on the literature review as variables that could impact efficiency. Again, the Levene statistic was less than .05, violating the assumption of equal variances of error. Using the standardized residual of pooled IOTA scores across the three size groups and three size periods, Shapiro-Wilk results determined the non-normality lies in the small circuits and in the first two time periods ($p < .05$; see Appendix C) which limits this violation. Additionally, none of the covariates are inter-correlated, or greater than .70 but all are significantly correlated with IOTA score (see Table 6).

Analysis of covariance requires additional assumptions be met. Specifically, the dependent variable (IOTA score) must have a linear relationship with the covariates in the model, an assumption met by analyzing the scatterplot for IOTA score for each category of circuit size and Revision 7 period (see Appendix C). Furthermore, the regression slopes for the dependent variable across all the groups should be homogenous, or similar. Two methods were employed to analyze that this assumption had been met. The first were scatterplots with regression lines added for each subgroup which were visually inconclusive. The second and more stringent method was to statistically test for interaction effects between the covariates and the independent variables using two-way analysis of variance (see Appendix C for full table of results). This analysis reveals that the year over year difference in clearance rate does not violate this assumption for circuit size ($p = .770$) or Revision 7 period ($p = .138$). Filings per judge does not violate this assumption for Revision 7 period ($p = .274$) but does violate this assumption for circuit size ($p = .000$) though visually small and medium-sized circuits have quite similar regression slopes.

The second model includes control variables that are significantly related to IOTA score outcomes in the earlier regression model, and both models produce similar R^2 values (regression: 66.2%; ANCOVA: 68.3%). In this model, circuit size has a significant main effect on IOTA score, accounting for the other factors. Small and large circuits are not significantly different in their IOTA scores (.757 and .762, respectively; $p = .506$), and small and medium-sized circuits do not differ significantly (p = .062). However, large circuits have significantly higher IOTA scores than medium-sized circuits (mean difference = .016, p = .007). The power of this analysis is less than .80 (P=.711). In terms of the main effect of the policy intervention, the results show that the first time period IOTA score is significantly higher than the scores of the second (.776 to .756, p = .001) and third periods (.776 to .733, p = .000). Additionally, the second time period IOTA score is significantly higher than the last period's score (p = .000). The power of this model meets acceptability standards (P = 1.0). The interaction effect of these two variables is again significant (F = 3.484, p = .008, P = .858). Small circuits decrease in estimated IOTA score over all three periods (.793, .761 and .718, respectively). Scores of medium-sized circuits decline as well in all three periods (.765, .746 and .725, respectively) but scores of large circuits hold quite steady (.769, .761 and .755, respectively). With the covariates included, the interaction effect takes place in the middle time period (post-enactment) for small and large circuits, and in the post-intervention period for medium and small-sized circuits. In essence, scores of small circuits go from most to least efficient over the policy span, but were still higher than medium-sized courts until Revision 7 took effect. The results also show that Revision 7 period had a much stronger influence on IOTA score than did circuit size alone.

The assumption violations of the two-way analysis of covariance have been discussed and are important to note and take into account. That said, they help to draw a contrast between the two models. The first model explained 16.4% of the variance in IOTA scores while the second accounted for 68.3%, a difference of 51.9%. Thus, while the statistical assumptions were violated for the analysis, the literature is supported in that these variables do impact efficiency outcomes. Accounting for these factors made the impact of circuit size significant in the second model when it was not in the first. Furthermore, the impact of Revision 7 is significant as a main effect, with and without control variables, and as an interaction with circuit size, with or without the control variables accounted for in the model.

The above models specify the results of the regression model and provide enough evidence to reject the first hypothesis: Florida's circuit courts did not get more efficient over the three policy periods. In fact, the results from the two-way ANOVA and ANCOVA models show that whether controlling for other factors or not, the circuits of all sizes were either becoming less efficient or showing no change.

The second hypothesis cannot be rejected conclusively: there is a significant interaction effect in both models between circuit size (small, medium and large), intervention period and IOTA score. Circuit size alone does not have a significant main effect on IOTA outcome. Without controlling for other effects, small circuits go from the most efficient over the first two time periods to the least efficient after the intervention of Revision 7. When other factors are controlled for, circuit size does show a significant main effect. Medium-sized circuits' IOTA scores also decreased but are higher than those small circuits post-enactment. The large circuits are shown to have maintained their relative mean efficiency, but went from the least efficient pre-enactment to the most efficient post-implementation. This finding holds true even when controlling for the effects of filings per judge, clearance rate difference and the baseline IOTA score of 1993/94. The effect size of this intervention is small ($d = .046$) but the power of the analysis meets acceptability standards ($P = .858$). Thus, there is conclusive validity for asserting that efficiency changes over the policy intervention periods were not equivalent across all circuit sizes. Although the expected efficiency gains were not realized (H_1), the efficiency losses were greatest among the small and medium-sized circuits. The interaction effect occurred, because large circuits maintained fairly stable IOTA scores while small and medium-sized circuits declined in efficiency relative to Revision 7 interventions (H_2).

Productivity Change Analysis

Malmquist Productivity Index Results

The following section provides the analysis for the third and final study hypothesis: that adding judges reduces circuit productivity. The main reasons for using this methodology was (1) to analyze productivity changes over time to inform the courts as an enhancement to the efficiency analysis; (2) to discover the impact that Revision 7 intervention years had on productivity and (3) to place the current policy debate between judges, productivity and efficiency within the context of the Florida court system.

Table 11 below displays the results for the MPI analysis for the circuit courts from 1993/94 through 2007/08 for the overall system and for each circuit. These results are essential to obtaining year-over-year changes in total factor productivity (TFPCH) that are then regressed upon the number of judges added controlling for other factors. Secondary analysis examines the interaction of judges added, circuit size and Revision 7 period through the application of two-way analysis and covariance models.

Table 11: Malmquist Productivity Index Results, By Year and Circuit, 1993/94 through 2007/08

	EFFCH	ΔEFFCH %	TECHCH	PECH	SECH	TFPCH	ΔTFPCH	Judges Added
By Year								
1994-95	1.134	+13.4	0.867	1.048	1.082	0.984	-1.6%	+8
1995-96	0.995	-0.5	0.946	1.014	0.981	0.941	-5.9%	+13
1996-97	0.877	-12.3	1.164	0.965	0.908	1.021	+2.1%	+6
1997-98	0.965	-3.5	1.009	1.060	0.901	0.973	-2.7%	+7
1998-99	*0.878*	*-12.2*	*1.161*	*0.903*	*0.972*	*1.019*	*+1.9%*	*0*
1999-00	1.173	+17.3	0.748	1.118	1.049	0.878	-12.2%	+25
2000-01	0.917	-8.3	1.130	1.010	0.908	1.036	+3.6%	0
2001-02	0.951	-4.9	0.987	1.007	0.944	0.938	-6.2%	+16
2002-03	1.126	+12.6	0.884	0.970	1.161	0.995	-0.5%	+18
2003-04	1.081	+8.1	0.920	1.019	1.062	0.994	-0.6%	0
2004-05	*1.019*	*+1.9*	*0.960*	*0.999*	*1.021*	*0.979*	*-2.1%*	*0*
2005-06	0.879	-12.1	1.000	0.949	0.926	0.879	-12.1%	+37
2006-07	0.912	-8.8	1.004	1.047	0.871	0.916	-8.4%	+35
2007-08	1.021	+2.1	1.065	0.975	1.047	1.087	+8.7%	0
Mean	0.990		0.982	1.005	0.986	0.973	-2.7%	+11.8
By Circuit								
1	1.003	+0.3%	0.982	1.010	0.993	0.985	-1.5%	+5
2	0.976	-2.4%	0.982	0.994	0.982	0.959	-4.1%	+5
3	0.993	-0.3%	0.982	1.009	0.984	0.975	-2.5%	+2
4	1.002	+0.2%	0.982	1.008	0.994	0.984	-1.6%	+7
5	0.967	-3.3%	0.982	0.999	0.968	0.950	-5.0%	+15
6	1.011	+1.1%	0.982	1.016	0.995	0.993	-0.7%	+9
7	0.984	-1.6%	0.982	0.998	0.986	0.967	-3.3%	+8
8	0.972	-2.8%	0.982	0.989	0.982	0.954	-4.6%	+4
9	0.978	-2.2%	0.982	1.000	0.978	0.960	-4.0%	+16
10	0.970	-3%	0.982	0.996	0.973	0.952	-4.8%	+12
11	1.005	+0.5%	0.982	1.008	0.997	0.987	-1.3%	+14
12	0.996	-0.4%	0.982	1.010	0.986	0.978	-2.2%	+6
13	0.992	-0.8%	0.982	1.006	0.986	0.975	-2.5%	+13
14	0.976	-2.4%	0.982	1.000	0.976	0.959	-4.1%	+4
15	1.018	+1.8%	0.982	1.017	1.001	1.000	0	+4
16	1.000	0	0.982	1.000	1.000	0.982	-1.8%	0
17	1.010	+1%	0.982	1.019	0.991	0.992	-0.8%	+14
18	0.983	-1.7%	0.982	0.995	0.988	0.965	-3.5%	+7
19	0.983	-1.7%	0.982	1.005	0.978	0.965	-3.5%	+4
20	0.989	-1.1%	0.982	1.014	0.975	0.971	-2.9%	+13
Mean	0.990		0.982	1.005	0.986	0.973		+8.3

The results reveal that in general the Florida circuit courts had a mean productivity decrease (TFPCH) of -2.7% from 1993/94 to 2007/08. Of the fourteen years, there were productivity losses year-over-year in ten years, averaging -5.2%, and increases in four years, averaging +4%. Mean pure efficiency change (PECH) was quite stagnant over this period as a whole (1.005). When analyzed by circuit, none experienced productivity gains over the time period, and only one—the Fifteenth—had no change. Two circuits experienced productivity decreases of less than a percentage point (the Sixth, 0.7% and the Seventeenth, 0.8%). All of these circuits are large, and all three experienced pure efficiency increases of 1.7%, 1.6% and 1.9%, respectively. The Fifth Circuit experienced the largest productivity loss, at 5%. Four circuits experienced productivity losses between 1 and 2%; four had productivity losses between 2 and 3%; three were between 3 and 4% and the remaining five circuits had decreases between 4 and 5%. Over this span, there were pure technical efficiency (PECH) losses in six years, ranging from -9.7% to -.01% and eight years of pure technical efficiency gains ranging from 0.7% to 11.8%.

The Revision 7 intervention dates provide some valuable information. In the year when Revision 7 was enacted, there was a productivity increase of 1.9% in the aggregate system but a pure efficiency loss of -9.7%. The increase in productivity came from technical change (TECHCH = 1.161) not efficiency change (EFFCH = 0.878). In the year of implementation, there was a 2.1% productivity loss over the prior year, attributable more to technological change loss (TECHCH = 0.96) than efficiency gain (EFFCH = 1.019). These results imply that in the first intervention period productivity gains resulted more from innovation than from efficiency gain, but that by the time Revision 7 was implemented, the gains in efficiency were offset by the loss of technical change, resulting in overall productivity loss.

More interesting is what happened in the years directly after the intervention of Revision 7. The analysis shows that the two largest productivity losses followed Revision 7 interventions (1999/00 = -12.2%; 2005/06 = -12.1%) and were nearly identical. In 1999/00 there was a 17.3% increase in efficiency change (EFFCH = 1.173) after four years of efficiency change decreases that totaled 28%. This productivity loss is mainly attributable to the 25.2% loss in technological change (TECHCH = 0.748). In 2005/06, the year before the foreclosure crisis in Florida, there was no technological change from the prior year (TECHCH = 1.000) but a -12.1% efficiency change (EFFCH = 0.879). In every year after implementation of Revision 7, technological change outpaced efficiency gains. By 2006/07 there had been six consecutive years of productivity loss, totaling 29.9%. This confirms the earlier efficiency results that showed the courts becoming less efficient as time progressed.

These findings bring us to the adding judges/increasing efficiency and productivity debate, which will be looked at both system-wide and by circuit in the Florida context. The two intervention years (1998/99 and 2004/05) saw no new judgeships added, but the subsequent years with the largest productivity losses had increases in judgeships of 25 and 37 respectively. In fact, there were five years in which no judges were added to the system, during which productivity increased on average by 2.3%; three years in which fewer than 10 judges were added to the system and productivity decreased by 0.7%, and six years when more than 13 judges were added and productivity fell on average by 7.5%. How the number of judges affects efficiency is less clear. In each of the above described periods, efficiency changes were -3.7%,

-0.1% and 0, respectively. In some years, the addition of judges had the effect of permitting the system to catch up to the efficiency frontier, and in some years adding of judges had the effect of reducing efficiency. This represents the main problem in using a predicted amount of judges based on past filings, especially if too many judges are added in a given year.

The Fifteenth and Fifth Circuits are important examples. The Fifteenth Circuit saw four judgeships added over the fifteen-year period, with no change to productivity (TFPCH = 0; the only circuit not to lose productivity) and a +1.8% efficiency change; those figures support the resource allocation decision to add four judgeships. In contrast, the Fifth Circuit added fifteen judges and had the largest decline in productivity (5%) and the largest negative efficiency change (-3.3%). Thus, the resource allocation of fifteen judgeships, according to this analysis, may have been too many. The methodology used here clearly emerges as one with great potential to influence court resource allocation decisions on the basis of productivity and efficiency. The results of the final analysis follows, regressing these productivity and efficiency changes on the number of judges added, by circuit and for the system, while including Revision 7 periods and circuit size.

Correlation Analysis

Table 12 below shows the bivariate correlation analysis between TFPCH, judges added, the control variables (filings per judge and clearance rate difference) as well as several other study variables for specificity in the model. These variables are year (continuous), circuit size (continuous) and dummy variables that represent the Revision 7 policy intervention periods (dummy1 = post-enactment period; dummy2 = post-intervention period). The results show that circuit population (r = .058, p = .336), year (r = -.003, p = .957), dummy1 (r = -.035, p = .554) and dummy2 (r = -.056, p = .354) are all neither strongly nor significantly correlated with total factor productivity change. Filings per judge (r = .336, p = .000) and clearance rate difference (r =.297, p = .000) are significantly and positively correlated, albeit weakly, with TFPCH. As expected, the number of judges added has a moderately negative and significant correlation to TFPCH (r = -.603, p = .000).

Table 12: Productivity Change Analysis Variable Correlation

		CIRCPOP	YEAR	INTDUMMY1	INTDUMMY2	FILJUDGE	PERCHCLEAR	JUDGEADD	TFPCH
CIRCPOP	Pearson r	1							
	Sig. (2-tailed)								
	N	300							
YEAR	Pearson r	.159	1						
	Sig. (2-tailed)	.006							
	N	300	300						
INTDUMMY1	Pearson r	.126	.818	1					
	Sig. (2-tailed)	.029	.000						
	N	300	300	300					
INTDUMMY2	Pearson r	.125	.768	.426	1				
	Sig. (2-tailed)	.030	.000	.000					
	N	300	300	300	300				
FILJUDGE	Pearson r	.081	-.053	-.068	-.081	1			
	Sig. (2-tailed)	.162	.356	.243	.161				
	N	300	300	300	300	300			
PERCHCLEAR	Pearson r	-.069	-.130	.015	-.187	-.143	1		
	Sig. (2-tailed)	.232	.025	.800	.001	.013			
	N	300	300	300	300	300	300		
JUDGEADD	Pearson r	.272	.172	.111	.210	-.081	-.015	1	
	Sig. (2-tailed)	.000	.004	.064	.000	.175	.809		
	N	280	280	280	280	280	280	280	
TFPCH	Pearson r	.058	-.003	-.035	-.056	.336	.297	-.603	1
	Sig. (2-tailed)	.336	.957	.554	.354	.000	.000	.000	
	N	280	280	280	280	280	280	280	280

CIRCPOP=Circuit Population; YEAR=Year (1-15); INTDUMMY1= 1998/99-2003/04; INTDUMMY2= 2004/05-2007/05
FILJUDGE=Filings per Judge; PERCHCLEAR=% Change in Clearance Rate from Prior Year; JUDGEADD=Number of Judges Added;
TFPCH=Total Factor Productivity Change

Productivity Change Hierarchal Regression Analysis Results

The regression analysis tests the hypothesis that productivity change is a function of the number of judges added year-over-year, specifically that the addition of judges decreases productivity change. Hierarchal regression analysis is utilized to control for filings per judge and clearance rate difference. The correlation analysis above indicates a negative and significant relationship between judges added and productivity change. Using the correlation analysis, the model will contain judges added as the independent variable, TFPCH as the dependent variable and control for filings per judge and the percentage change in year-over-year clearance rate.

All regression assumptions were analyzed and meet acceptability standards (see Appendix C). The Durbin-Watson statistic is 1.673, within the acceptable level of 1-3 though slightly below the optimal measure of 2 which means that the assumption of independence of errors was not violated. There were acceptable correlation coefficients between independent variables as well (none greater than $r = .70$). The assumption of no multicollinearity was met as there was no VIF less than 10 or Tolerance value greater than .10.

In terms of outliers**,** no Cook's value was greater than 1.0; Mahalanobis Distance revealed 2 of 280 greater than critical value of 13.82 (0.7% of sample), 12 of 280 observations had standardized residuals +/- 2 standards deviations from the mean (4.2%); boxplots of dependent variable distribution shows 6 of 280 observations as outliers (2.1%) and boxplots of standardized and studentized residuals also show 2.1% of the sample as outliers. Normality is established through examination of the histogram of the TFPCH standardized residuals. The skewness of the dependent variable is 1.4 (-.205/ .146) within the acceptable range of -2 to +2. Kurtosis is slightly high (6.08; 1.765/ .29). In sum, these figures represent a fairly normal distribution considering the MPI is a non-parametric methodology. In terms of linearity and constant variance, this assumption is met through careful inspection of residual plots as the random pattern shows constant variance; linearity is acceptable as there is a linear relationship graphically established between dependent and independent variable.

The ANOVA table for the regression model with control variables is significant (F = 116.800, p = .000) and explained 23.7% of the variance in productivity change. The number of judges added explained an additional and significant 32.2% of the variance of productivity change (p = .000, t = -14.208, β = -.570), controlling for the influence of filings per judge and the clearance rate difference. As hypothesized, the addition of judges has the effect of decreasing productivity at the circuit as well as the system level. The large negative beta weight shows the number of judges added to be a stronger influence on productivity change than the filings per judge and also to have a negative direction, as expected. This finding also supports the previous literature: as filings per judge and percentage change increase, so do productivity outcomes. When controlling for these influences, adding judgeships has the effect of decreasing productivity change outcomes. Table 12 below reports the regression outputs.

Table 13: Productivity Change Hierarchal Regression Analysis Outputs

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	D-W
1	.487[a]	.237	.232	.08780	.237	43.052	2	277	.000	
2	.748[b]	.559	.555	.06685	.322	201.861	1	276	.000	1.673

a. Predictors: (Constant), Filings Per Judge, Change in the Year Over Year Clearance Rate

b. Predictors: (Constant), Filings Per Judge, Change in the Year Over Year Clearance Rate, Judges Added

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.664	2	.332	43.052	.000[a]
	Residual	2.135	277	.008		
	Total	2.799	279			
2	Regression	1.566	3	.522	116.800	.000[b]
	Residual	1.233	276	.004		
	Total	2.799	279			

a. Predictors: (Constant), Filings Per Judge, Change in the Year Over Year Clearance Rate

b. Predictors: (Constant), Filings Per Judge, Change in the Year Over Year Clearance Rate, Judges Adde

		Unstandardized Coefficients		Standardized Coefficients			95% CI for B		Correlations		Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Partial	Part	Tolerance	VIF
1	(Constant)	.655	.045		14.588	.000	.567	.744				
	PERCHCLEAR	.624	.093	.356	6.708	.000	.441	.807	.374	.352	.977	1.023
	FILJUDGE	.000	.000	.390	7.351	.000	.000	.000	.404	.386	.977	1.023
	JUDGEADD											
2	(Constant)	.732	.035		21.140	.000	.664	.800				
	PERCHCLEAR	.597	.071	.341	8.421	.000	.457	.736	.452	.336	.976	1.024
	FILJUDGE	.000	.000	.342	8.420	.000	.000	.000	.452	.336	.970	1.031
	JUDGEADD	-.061	.004	-.570	-14.208	.000	-.069	-.052	-.650	-.568	.993	1.007

Dependent Variable: TFPCH

Productivity Change Analysis of Variance Results

For specificity and to enhance conclusion validity of the third and final hypothesis, several analyses of variance models were used to verify the mean differences in TFPCH across categories of judges added, circuit size and Revision 7 intervention period while controlling for filings per judge and clearance rate difference. The results are shown in Table 13 below. As done earlier, it is crucial to examine the assumptions that are required for analysis of variance and co-variance above and beyond that of regression (see Appendix C).

The first model employed one-way analysis of variance to analyze TFPCH between four categories of judges added (1 = no judges added; 2 = 1 judge added; 3 = 2 judges added and 4 = 3 or more judges added) without a covariate. The Levene statistic for this analysis was .958, meaning that equal variance of error across groups assumption is met despite the group sizes being unequal. All of the categories of judges added except for no judges added were normally distributed (Shapiro-Wilk statistic > .05), confirming the boxplots produced. The largest group was no judges added, mitigating against the slight departure from normality.

Table 14: ANOVA and ANCOVA Results for TFPCH and Categorical Judgeships Added

Model	R^2	Levene's	Variable	F-value	Sig.	Partial Eta^2	Power
1 ANOVA	40.7	.958	Judges Added	63.138	.000	.407	1.0
2* One-way ANCOVA	60.7	.129	Judges Added	86.060	.000	.485	1.0
3* Two-way ANCOVA	73.7	.000	Judges Added	96.981	.000	.534	1.0
			Circuit Size	25.100	.000	.165	1.0
			Revision 7 Period	10.192	.000	.074	.986
			Judge*Circuit size	11.807	.000	.218	1.0
			Judge*Period	2.030	.062	.046	.733
			Period*Circuit size	1.131	.342	.017	.354

*****controlling for filings per judge and clearance rate difference

The results reveal that the mean TFPCH decreases as the groups increase in category. When no judges were added to a circuit (n = 174), TFPCH averages an increase of 2.6% (TFPCH = 1.0261, σ = .0766). When a single judge is added, TFPCH averages a decline of 8.6% (TFPCH = .9132, σ = .0767, n = 68). When two judges are added, the average productivity decline is 10.5% (TFPCH = .8954, σ = .084, n = 23). When three or more judges are added in a single year, the productivity decline averages 16.2% (TFPCH = .8380, σ = .0825, n = 15). For all 280 observations, the average productivity loss is 2.2% (TFPCH = .9779, σ = .10). The categories of judges added are significant in this model (F = 63.138, p = .000, d = .407, P = 1.0) and explain 40.7% of the variance in TFPCH. Tukey and Scheffe post-hoc tests determined that the first category of judges added has significantly higher TFPCH than do the three other categories (mean differences of .11, .13 and .19, respectively). There is no statistical significance in TFPCH between the addition of 1 or 2 judges (p = .777) which means that the addition of the second judge does not significantly impact productivity. The category of 3 or more additional judges in a single year has significantly lower TFPCH than no judges added or 1 judge added (p < .05), but no significant difference appears from adding 2 judges (p = .117). Thus, according to this analysis, the best TFPCH outcomes occur when no judges were added. When judges were added, even a single judge, TFPCH decreases on average from the prior year but the addition of any more than one judge may not bring the type of productivity return required for the investment of resources.

The second model used one-way ANCOVA and controlled for the effect of filings per judge and clearance rate change on the relationship between TFPCH and categorical judgeships added. The Levene's test met acceptable standards (p = .129). The regression slopes for the change in clearance rate were homogenous across the four categories of judgeships added (see Appendix C) but the regression slopes for filings per judge showed variability. This makes sense as filings per judge decreases when 3 or more judges are added. Even when controlling for filings per judge and the change in clearance rate, the results of the previous analysis were replicated. TFPCH is highest and increasing only when no judges were added. No other categories of judges added are positive for TFPCH. Comparing the main effects, the category of no judges added is significantly higher in TFPCH than any of the other three categories (p = .000, mean difference of .110, .134, and .168, respectively). This model was strong overall (F = 86.060, p = .000, d = .485, P = 1.0).

The third model used a two-way ANCOVA methodology, incorporating the earlier analysis of categorical circuit size and Revision 7 intervention period categories while controlling for filings per judge and the clearance rate difference. This model incorporates all of the analysis into a single test and is able to test both the main effects as well as the interaction effects of the variables simultaneously to focus the current debate on the Florida data. The Levene's statistic shows that error variance is not equal across all groups.

The results of this analysis reveal that there is a significant main effect at $\alpha < .05$ relative to TFPCH for: judges added (F = 96.981, p = .000, d = .534, P = 1.0); circuit size (F = 25.100, p = .000, d = .165, P = 1.0); and Revision 7 period (F = 10.192, p = .000, d = .074, P = .996). Overall, the variables explain 73.7% of the variability in TFPCH. That said, there is only one significant interaction effect between categorical judges added and categorical circuit size relative to TFPCH (F = 11.807, p = .000, d = .218, P = 1.0). When controlling for filings per judge and clearance rate difference, the estimates of TFPCH between the Revision 7 intervention periods and judges added is not a significant interaction (F = 2.030, p = .062, d = .046, P = .733). Furthermore, there is no significant interaction between Revision 7 period and circuit size relative to productivity change.

The main effect for circuit size reveals that small circuits have significantly larger TFPCH decreases than medium or large circuits have, and medium-sized circuits have significantly larger TFPCH decreases than large circuits have. Essentially, when controlling for filings per judge and clearance rate difference, large circuits have the least average loss of productivity (TFPCH = .951), and small circuits the greatest average productivity loss (TFPCH = .888). TFPCH for medium-sized circuits significantly outperformed that for the smaller circuits (mean difference of .031), but significantly underperformed that for large circuits (mean difference of -.034).

The significant interaction of categorical judges added and categorical circuit size reveals the interaction to occur in the category of no judges added. When no judges are added and filings per judge and clearance rate difference are controlled for, small circuits increase their total productivity factor the most (TFPCH = 1.030), followed by large (1.028) then medium-sized circuits (1.022). The addition of a single judge reverses this order which continues through all categories of judges added: large circuits have lower decreases to TFPCH from 1 to 3+ judges (.971, .950 and .854, respectively); medium-sized circuits have the next lowest decreases (.928, .846 and .802, respectively); and small circuits have the greatest decreases to TFPCH (.828, .755 and .774, respectively). This finding holds up across all three Revision 7 policy periods.

The results inform us that the addition of a single judge, controlling for filings per judge and clearance rate difference, reduces TFPCH on average 17.2% for small circuits, 7.2% for medium-sized circuits and 2.9% for large circuits. For the addition of two judgeships, results for small circuits had to be estimated using a modified population mean. The same is true for small and medium-sized circuits that added 3 or more judges. With that limitation, the addition of two judges in a circuit in a year reduces TFPCH by 24.5% in small circuits, 15.4% in medium-sized circuits and 5% in large circuits. Adding three or more judges has the effect of reducing TFPCH in small circuits by 22.6%, in medium-sized circuits by 19.8% and in large circuits by 14.6%.

Thus there is clear evidence that the third hypothesis could not be rejected: adding judges to circuit courts, while controlling for filings per judge and clearance rate difference, significantly reduced circuit productivity in general. Furthermore, a significant interaction is shown between the category of judgeships added and categorical circuit size, relative to productivity loss on average.

Summary of Findings

Overall the study revealed large inefficiencies and noticeable productivity losses in the Florida circuit court system over time. Efficiency losses varied within and between circuits even though the period of study was an era of great technological advances and policy change in the state of Florida. Productivity losses occurred throughout almost the entire system except for a single circuit that showed no change. Those results are able to inform both a specific state policy (Revision 7) as well as a broad policy debate—adding judges versus increasing productivity.

The first hypothesis in the study was rejected: Florida's circuit courts have not become more efficient over time relative to the Revision 7 policy intervention. Hierarchal regression analysis revealed that the continuous year explains only 4.7% of the variance of IOTA scores at the circuit level, controlling for other factors, when courts are pooled. Analysis of variance found no significant differences in IOTA scores by circuit size as a main effect (F = .159, p = .853, d = .001, P = .074), but significant differences in IOTA scores by Revision 7 period analysis (F = 18.773, p = .000, d = .114, P = 1.0), the focus of the first hypothesis. This test revealed that contrary to the hypothesized result, the pre-enactment period has a higher mean IOTA score than the post-enactment/pre-implementation period (.78 to .76) though the difference is not statistically significant. Furthermore, the post-enactment/pre-intervention period has a higher mean IOTA score than does the post-intervention period (.72), a difference that was significant. Moreover, the post-implementation period has a significantly lower mean IOTA score for the pre-enactment period, contrary to what was hypothesized to occur. Even when controlling for the baseline IOTA score, clearance rate difference and filings per judge, Revision 7 period still had a significant main effect on IOTA score (F = 22.005, p = .000, d = .133, P = 1.0).

The second hypothesis was not rejected: there is a significant difference of IOTA scores between circuit sizes over Revision 7 time periods. The first model used a two-way ANOVA methodology with no control variables and found no significant main effect for circuit size. This test did however reveal a significant interaction between circuit size and Revision 7 period (F = 5.580, p = .000, d = .071, P = .977). This is the result of large circuits maintaining their efficiency while efficiency of small and medium-sized circuits decreased from the enactment of Revision 7 through implementation.

The last model used a two-way ANCOVA approach. This model controlled for baseline IOTA score, clearance rate difference and filings per judge and also found significant interaction effects (F = 3.484, p = .008, d = .046, P = .858) with the model explaining 68.3% of the variance in IOTA scores. When controlling for these factors, interaction occurs in the post-enactment period for small and large circuits and in the implementation period for medium and small sized circuits. Both models show a significant interaction effect and fail to reject the hypothesis: efficiency changes over Revision 7 periods were not equivalent for all three categorical circuit sizes even though the control variables slightly mitigated the overall strength of this relationship. When control variables were included, circuit size had a significant main effect with IOTA score at $\alpha < .05$ (F = 3.988, p = .020, d = .027, P = .711) though it was statistically weaker than the interaction effect of circuit size and Revision 7 period.

The third hypothesis was also not rejected: increasing judgeships at both the system and circuit levels does in fact reduce overall productivity, as posited by Beenstock and Haitovsky (2004) in their study of Israeli courts. MPI analysis reveals that the system lost the most productivity following the largest increase in judgeships allocated. For the seven years in which 10 or more judges were added to the system, TFPCH averages a decrease of -6.86%. The two single largest decreases in productivity followed Revision 7 intervention years directly and correlated with the addition of the most judges to the system over the study period. The five years in which no judges were added average a 2.3% increase in TFPCH. In general, the court system could achieve Heydebrand's (1977) technocratic strategy of adding judges and increasing productivity, as in 1996/97, when 6 judges were added and productivity increased 2.1%. That is accomplished by not adding more judges than would reduce productivity.

In terms of circuit level, two analyses revealed the depth of this relationship. Hierarchal regression analysis revealed that the total number of judges added explains a significant 32.2% of the variance of TFPCH, controlling for filings per judge and clearance rate difference. Analysis of variance (with no covariates) determined that TFPCH decreases with each successive category of judges added (1 = none, 2 = 1 judge, 3 = 2 judges, 4 = 3 or more judges). When no judges were added, TFPCH averages a 2.6% increase; a single judge added correlates with a 8.6% decline; two judges with a 10.5% decline; and when more than 3 judges were added to a circuit there was is average decline of 16.2%. In all, circuits experienced a 2.2% productivity loss over the entire policy period and productivity on average increased only when no judges were added. In this analysis, categorical addition of judges explains 40.7% of the variance in TFPCH, with post-hoc tests revealing that the no-judge-added category results in significantly higher TFPCH than for the other categories. There is no statistical difference between the addition of 1 or 2 judges, but 3 or more judges added results in significantly lower TFPCH than for 2 judges added. As soon as a single judge was added, productivity decreased from the prior year and returns on further judges added diminished.

A one-way ANCOVA model tested this relationship while controlling for filings per judge and clearance rate difference, and the above results were replicated. The final model was a two-way ANCOVA that included circuit size and Revision 7 period for specificity. The judges added category had a significant main effect with TFPCH (F = 45.440, p = .000, d = .355, P = 1.0) as did circuit size (F = 30.439, p = .000, d = .197, P = 1.0) and Revision 7 period (F = 13.413, p = .000, d = .098, P = .998), though the relationship is weaker for the latter two variables than for the former variable. The only significant interaction effect is shown between judges added and circuit size and TFPCH (F = 3.732, p = .001, d = .083, P = .959). When no judges are added, small circuits have the greatest increase in TFPCH (1.030), with large (1.028) and medium-sized circuits (1.022) having similar increases. As soon as a single judge is added, this finding reverses and large circuits have much more narrow TFPCH decreases throughout the remaining categories of added judges (.971, .950 and .854, respectively). TFPCH for medium-sized circuits decreases at a greater depth (.928, .846 and .802 respectively), while small circuits have the greatest TFPCH decreases with each additional judgeship allocated (.828, .755 and .774, respectively). As circuit size decreases, the addition of a single judge increases a circuit's drop in TFPCH. Thus, the third hypothesis could not be rejected, and the results show the depth of productivity loss across circuit size. Interestingly enough, there is no significant interaction effect between judges added and Revision 7 period (F = 1.451, p = .196, d = .034, P = .560), meaning the policy intervention does not affect TFPCH in the way that circuit size does over the entire course of the policy, with the circuit as the unit of analysis.

CHAPTER FIVE: SUMMARY OF MAJOR FINDINGS, IMPLICATIONS, and CONCLUSIONS

Summary of Major Findings

The findings of this study have the potential to greatly inform and influence court policy and practice relative to the performance dimensions of technical efficiency and productivity. Revision 7 was essentially a policy intervention for change in Florida's circuit court system. Carlson et al. (2008) found that the policy brought about greater resource equity between circuits and enhanced court accountability while enjoying broad political support across the liberal/conservative spectrum (Caplow and Simon, 1999). The results of this dissertation, however, reveal that Revision 7 has not enhanced the technical efficiency of Florida's court system as expected. Furthermore, the study's quantitative analysis reveals that the mean IOTA score in Florida over time is .76, meaning that there are definitive inefficiencies within years, between circuits and over the policy cycle of Revision 7. The pooled DEA analysis reveals the highest mean IOTA score over the 15-year period to be .86, and only three DMU's out of 300 (1%) rated as technically efficient. Seven circuits saw increases to their IOTA score between 1993/94 and 2007/08 greater than +.01 (ranging from +.01 to +.12), while thirteen circuits saw decreases of at least -.01 (ranging from -.01 to -.21). While large circuits held relatively stable, the greatest declines in technical efficiency were among the small and medium-sized courts. Thus, the theoretical bases for expected efficiency gains relative to Revision 7—institutional and resource dependency theories—do not explain court efficiency outcomes' changes as predicted.

The system became *less* efficient since the policy implementation and remained the same between the first two policy periods.

Though there are not many court efficiency studies that can be generalized to Florida and thus compared directly, the mean IOTA score of Florida's circuit courts over time is lower than those found in North Carolina, Germany or Norway (Lewin, Morey and Cook, 1982; Kittelson and Forsund, 1992; Schneider, 2005). This could be attributed to the fact that the analysis was single input/output based, which results in more varied efficiency outcomes; or it could be that there are wider efficiency variations in the Florida system.

The next major finding is the significant interaction effect on IOTA scores between the categorical Revision 7 period (pre-enactment; post-enactment/pre-implementation; and post-implementation) and the categorical court size (small, medium or large). This interaction is not due to large circuits becoming more efficient over time. In fact, large circuits generally had steady efficiency scores throughout the policy cycle. However, when controlling for other factors, small and medium-sized circuits lost efficiency over the policy cycle, thus leaving the large circuits as the most efficient. The policy has had the effect of reducing efficiency outcomes in the smaller and more medium-sized courts while having no impact either way on the large circuits. Such a finding suggests that the smaller and medium-sized courts may have chosen the path of policy resistance, and that the large courts may be institutionalized to the point of being unaffected by Revision 7 in terms of efficiency outcomes. Resource dependency theory allows for this reaction, but it was not expected to occur in the Florida courts due to the strong desire for institutional legitimacy. Perhaps it should be expected in future court research.

One of the main problems of Revision 7 is that efficiency and productivity analyses were not conducted before the policy was enacted or implemented—or since, despite the fact that enhanced efficiency was a goal driving the policy intervention. The debate over the judicial resources given to the court has been shown not to be an isolated policy debate specific to Revision 7, but rather one found over time and across cultures (Chandler, 1960; Packer, 1964, 1968; Kittelson and Forsund, 1992; Rowles, Mackey and McMillan, 1993; Tulkens, 1993; Florida Supreme Court, 1995; Phillipino House of Representative, 2004; Beenstock and Haitovsky, 2004; da Conceição Sampaio de Sousa and Schwengber, 2005; Uekert et al., 2006), though rarely has research examined the effect on productivity of adding judges. The results of this study confirm the findings of Beenstock and Haitovsky (2004) in that adding judges does indeed reduce productivity at least in the Florida system over the past fifteen years. The productivity losses are intensified with the circuits' decrease in categorical size. The study results show that the addition of a single judge reduced TFPCH on average 17.2% for small circuits, 7.2% for medium-sized circuits and 2.9% for large circuits, when controlling for other factors. For large circuits, when 3 or more judges are added, TFPCH decreases 14.6% on average, an important finding because large circuits consume a great deal of the overall circuit court resources.

This work is significant in its findings for the Florida circuit court system, and the data used to test the study hypotheses has the ability to inform resource decisions and performance measurement if aggregated into performance benchmarks. Thus, in the section that follows, a series of benchmark charts are created for the system and for the circuits on the dimensions of technical efficiency and productivity.

Performance Benchmarks

One of the main purposes of this study was to inform the courts about resource utilization that could aid organizational decision making in an environment of resource dependency and resource scarcity. One aspect of this purpose is to create performance benchmarks for court efficiency and productivity. To accomplish that, the data used in the study to analyze efficiency and productivity have been structured into percentiles to establish solid, reasonable benchmarks. Tables 15 and 16 below display the efficiency benchmarks for the entire system as well as for each circuit size, each policy intervention period and each individual circuit. Tables 17 and 18 do the same for the productivity benchmarks. All data is derived from the IOTA and TFPCH values.

Table 15: Technical Efficiency Benchmarks by Percentile, Court System by Year

Year	5^{th}	10th	25th	50th	75th	90th	95th
1	.6525	.6635	.7132	.7715	.8283	.9871	1.0000
2	.6303	.6744	.7230	.8010	.8230	.8669	.9829
3	.6153	.6469	.7078	.7485	.8110	.8668	.8822
4	.6913	.6997	.7285	.7770	.8328	.9170	.9459
5	.6900	.7105	.7335	.7625	.8393	.8710	.8777
6	.6811	.7036	.7393	.8045	.8235	.9116	.9958
7	.6502	.6744	.6972	.7390	.7770	.8136	.8360
8	.6910	.6925	.7122	.7560	.8088	.8462	.9412
9	.6217	.6372	.6828	.7590	.7955	.8056	.9267
10	.6609	.6971	.7132	.7540	.8258	.8390	.8704
11	.6624	.6707	.7268	.7620	.7773	.8401	.8439
12	.6279	.6466	.7052	.7300	.8085	.8294	.8357
13	.5762	.6020	.6428	.7025	.7605	.8240	.8898
14	.5992	.6052	.6440	.6865	.7218	.7356	.8224
15	.5940	.6356	.7018	.7495	.7783	.8793	.9013
System Pooled	.6344	.6662	.7052	.7540	.8050	.8400	.8777
Small Circuits Pooled	.6110	.6340	.6888	.7560	.8258	.8715	.9389
Medium Circuits Pooled	.6476	.6790	.7185	.7620	.8055	.8264	.8388
Large Circuits Pooled	.6535	.6760	.7050	.7410	.7810	.8278	.8900
Time Period 1	.6626	.6892	.7255	.7720	.8230	.8670	.9219
Time Period 2	.6662	.6861	.7142	.7590	.8035	.8354	.8708
Time Period 3	.6001	.6311	.6685	.7135	.7703	.8225	.8357

Table 16: Technical Efficiency Benchmarks by Percentile, by Circuit over Full Policy Span

Circuit	5th	10th	25th	50th	75th	90th
1	.7270	.7312	.7610	.7850	.8220	.8408
2	.5750	.5852	.6270	.7290	.8040	.9284
3	.6000	.6204	.6740	.7110	.8170	.9172
4	.6860	.6878	.6980	.7130	.7540	.7910
5	.7240	.7246	.7630	.7830	.8160	.8326
6	.6410	.6476	.6730	.7060	.7320	.7510
7	.6790	.6898	.7130	.7240	.8070	.8264
8	.6200	.6272	.6690	.7930	.8390	.8598
9	.7720	.7726	.8020	.8270	.9020	.9930
10	.6640	.6862	.7200	.7880	.8060	.8412
11	.6790	.6850	.7140	.7380	.7500	.7848
12	.6210	.6366	.6910	.7190	.7580	.7960
13	.7360	.7462	.7640	.7710	.8220	.8300
14	.6870	.6876	.6980	.7540	.8090	.8584
15	.6140	.6224	.6620	.6970	.7350	.7490
16	.6800	.7088	.7320	.7830	.8670	.9676
17	.6570	.6696	.7050	.7790	.8010	.8248
18	.6020	.6254	.6490	.7040	.7560	.7948
19	.6310	.6382	.6910	.7760	.8460	.8684
20	.6600	.7002	.7530	.7770	.8230	.8784

Table 17: TFPCH Performance Benchmarks by Percentile, Court System by Year, 1993/94-2007/08

Year	5th	10th	25th	50th	75th	90th	95th
2	.7973	.8607	.9248	1.0065	1.0543	1.0992	1.1182
3	.8081	.8140	.9045	.9365	1.0020	1.0527	1.0549
4	.8432	.8484	.9435	1.0170	1.1220	1.2045	1.2271
5	.8236	.8364	.9220	.9935	1.0285	1.0836	1.0926
6	.9164	.9257	.9728	1.0190	1.0610	1.1191	1.1591
7	.6687	.6889	.8375	.8875	.9280	.9811	1.2186
8	.8518	.9816	1.0133	1.0310	1.0845	1.1230	1.1297
9	.7506	.8758	.9065	.9410	.9728	1.0276	1.1212
10	.8774	.8843	.9305	1.0050	1.0625	1.1004	1.1020
11	.8464	.9110	.9365	1.0010	1.0498	1.0856	1.1497
12	.8504	.9153	.9353	.9775	1.0255	1.0642	1.0765
13	.6765	.7257	.8368	.8885	.9518	1.0270	1.0471
14	.7054	.8099	.8418	.9090	1.0175	1.0545	1.0579
15	.9894	.9993	1.0278	1.0715	1.1305	1.2068	1.3401
System Pooled	.8221	.8471	.9163	.9870	1.0438	1.0908	1.1259
Small Circuits Pooled	.7290	.8195	.9163	.9880	1.0482	1.1095	1.1632
Medium Circuits Pooled	.8350	.8470	.8900	.9820	1.0510	1.0867	1.1247
Large Circuits Pooled	.8591	.9005	.9288	.9900	1.0375	1.0863	1.1231
Time Period 1	.8236	.8491	.9245	.9860	1.0493	1.1011	1.1478
Time Period 2	.8345	.8752	.9218	.9885	1.0438	1.0860	1.1240
Time Period 3	.7444	.8342	.8848	.9830	1.0405	1.0908	1.1378

Table 18: TFPCH Performance Benchmarks by Percentile, By Circuit 1993/94-2007/08

Circuit	5th	10th	25th	50th	75th	90th
1	.8770	.8875	.9193	1.0020	1.0360	1.0885
2	.7440	.7520	.8565	.9710	1.0578	1.1650
3	.6810	.7025	.9065	1.0320	1.0675	1.1625
4	.8180	.8200	.9280	1.0250	1.0575	1.1045
5	.8230	.8315	.8610	.9425	1.0690	1.0895
6	.8960	.9080	.9275	.9870	1.0293	1.1425
7	.8350	.8560	.9063	.9895	1.0305	1.0685
8	.8340	.8385	.8708	.9740	1.0230	1.0580
9	.8080	.8345	.9145	.9420	1.0395	1.0795
10	.7410	.7935	.8850	.9590	1.0565	1.0890
11	.9120	.9130	.9305	.9805	1.0118	1.1190
12	.8340	.8405	.8713	.9825	1.0693	1.1410
13	.8090	.8430	.9220	.9950	1.0440	1.0710
14	.7940	.8020	.8365	.9730	1.0488	1.1215
15	.9270	.9330	.9470	.9845	1.0588	1.1080
16	.8670	.8755	.9190	.9685	1.0193	1.1805
17	.8810	.8845	.9290	1.0075	1.0422	1.1240
18	.8470	.8475	.8835	.9430	1.0730	1.1455
19	.6680	.6710	.9345	1.0260	1.0715	1.1410
20	.7000	.7680	.9063	.9880	1.0445	1.2305

Top Performers

Technical Efficiency

One important aspect of benchmarking is identifying the top performing DMU. In the Florida circuit court system, the Ninth Circuit had the highest mean IOTA score over the fifteen year period (.86). In addition, the Ninth Circuit (a large circuit) was one of three technically efficient circuits of the three hundred DMU's, and it reached 90% efficiency in three other years. The Sixteenth Circuit (the smallest in the state) was also one of three technically efficient circuits, reached 90% in two other years and had a mean IOTA score of .81. The next highest mean IOTA score over the policy cycle was .79 (First, Fifth, Twentieth), all of which are medium-sized circuits. The First Circuit saw a slight increase in IOTA score over time (+.02); the Fifth Circuit decreased by -.05 and the Twentieth Circuit increased by +.10. However, none were technically efficient.

Between 1993/94 and 2007/08, the Ninth Circuit decreased in IOTA score by .10 while the Sixteenth Circuit decreased by .20. The mean IOTA score in the sample was .03 lower in 2007/08 than in 1993/94. That said, the mean IOTA score in 2006/07 was .10 lower than the score in 1993/94, meaning that 2006/07 marked the least efficient aggregate year in the system. In this year, the Ninth Circuit had an IOTA score of .83, and no other circuit was at greater than 74% efficiency. From these statistical criteria alone, the Ninth Circuit emerges as a top performer on the dimension of technical efficiency over the fifteen-year period of this study.

Productivity Change

Although no circuit increased its productivity over the span of the Revision 7 policy, the Fifteenth Circuit (a large circuit) was the only circuit with no decline in productivity (TFPCH = 0). This circuit also had fewer judges added (4) than any other large circuit had. The Sixth and Seventeenth Circuits, both large circuits, also had less than a 1% decline in TFPCH over the span of the study. For the medium-sized circuits, the smallest decrease in productivity was in the First Circuit (1.5%). In the small circuits, the smallest productivity loss was in the Sixteenth Circuit (1.8%). Thus, the Fifteenth Circuit was the best performer in terms of productivity.

Policy Recommendations

The policy implications of this study were stated earlier. The objective, empirical analysis has created performance measures and benchmarks in relation to the Revision 7 policy intervention. The larger debate of adding judges versus increasing efficiency and/or productivity has been analyzed. The circuit and system stakeholders have a body of evidence from which to reformulate their approach to resource acquisition and allocation, as do those who allocate the sought resources. Below are four specific policy implications derived from the literature and this quantitative analysis.

1. Revision 7 has not increased efficiency as foreseen when the policy was enacted. Courts are neither more efficient nor more productive than they had been. This situation is due mainly to efficiency losses over time in small and medium-sized circuits along with no change in large circuits. The areas of inefficiencies and losses to productivity make it difficult to endorse the need to add judgeships to most circuits, especially since using the variables in this study, the mean IOTA score in Florida's circuit courts is .76 and the average circuit has declined in productivity by 2.7%. Circuits should analyze the technological advances they have implemented over this time frame to ensure that they are getting maximum benefit for the cost of these management systems.

2. The courts should provide more data on their structures and processes in order to make possible a fuller model of court efficiency. This work provides a full accounting of circuit and system efficiency and productivity performance benchmarks that courts can use in making the

case for more resources or in selecting which courts are best to use for best practices. Florida's courts should produce and provide more public information in order to elicit more specific research on efficiency and productivity outcomes. Examples of doing so exist in other state systems and it is a major policy push by the NCSC that could increase the court system's ability to acquire more resources, inform and serve the citizens its circuits and develop a holistic view of performance integrating efficiency/productivity, the quality of justice, the equity of access and the level of service. Such information should include the extent of resources allocated to each court in terms of total personnel, total dollars and a full accounting of programs and court user satisfaction. Furthermore, the percentage of cases that are pending for given time periods (60, 90 and 180 days, as examples) is important data provided by other states that is lacking in Florida. Additionally, data on judicial experience by division would be helpful information to have in calculating efficiency and productivity outcomes. Such data could help to include in the analysis the effects of judicial training periods on outcomes as well.

3. Resource equity among the courts does not translate into efficient outcomes based on circuit size. Evidence-based resource allocation would require circuits to show they are using their current resources efficiently and becoming more productive if they are to receive more resources. In 2007/08, as filings increased and judgeships held flat, the courts were more efficient and productive. This fact is important since 32.2% of the productivity variance in this study is attributable to the addition of judges. The more judges are added in a single year to a circuit or the system, the more productivity decreases. The study found that productivity losses were nearly equivalent in small and medium-sized circuits (3.4 and 3.3%, respectively) but lower in

the large circuits (1.6%). Thus judicial additions should not be based on equitable distribution alone, nor simply on previous year's caseload, but also on productivity and efficiency criteria. The enhanced public information made available in line with the previous policy recommendation would permit the study of quality assurance and equity of access as judges are added or held constant in number.

4. Adding judges to circuits before they are maximizing current judicial resources in terms of efficiency and productivity is not the best resource decision. Judges should be not be added to the point of making the court less technically efficient and/or productive. Resource allocation decisions should include these criteria, and the current level of judgeships is appropriate until the benchmarks developed here are met consistently. One need only look at the Twentieth Circuit, which added 6 judges in one year (2006/07) and had a productivity loss of 30% (TFPCH = -.30). When no judges were added the next year and filings increased by 58%, there was a 34% increase in productivity. Without that unexpected increase in filings, however, it can be expected that productivity would have declined in this circuit. Thus, the use of filings alone should not drive the resource allocation decision about judgeships, but should rather be one of several competing and complementary criteria; note that despite nearly 2,400 filings per judge, the Twentieth Circuit was only at 89% technical efficiency in the pooled analysis meaning there was still capacity to be more efficiency and no implosion of productivity.

Limitations of the Study

The first limitation is the study's sole focus on efficiency and productivity without regard to the quality of court dispositions or the impacts of budget allocations. As stated earlier, these two perspectives are not a zero sum game or achieved at the expense of one another. This work makes no assessment of court quality in any regard, a limitation that further research can address and integrate with the results of this analysis. An example is a recent report by the NCSC (Kiesel, 2010) in which access and fairness of the 20th Judicial Circuit in Florida was analyzed through survey research, with respondents answering 9 of 10 questions to a satisfaction of at least the target of 80%. Combining this research with the present study, at least 80% of respondents are satisfied with access and fairness in the 20th Circuit and the circuit has a mean efficiency score of .79 over the period of study. Carlson et al. (2008) looked at the resource equity and accountability of Revision 7, and this work has looked at efficiency and productivity relative to that policy change. Quality is no less important. Quality should be analyzed, but was not in the purpose of this work, so no comments are made about the quality of the circuits' work either in general or relative to Revision 7.

A second limitation is methodological: the DEA analyses are single input/single output. Inclusion of other inputs and/or outputs may change the efficiency outcomes. The input and output chosen were based on the literature, the current debate in Florida and the available data. This limitation could be overcome if more data were available from the courts or the state, such as personnel totals, total budgets, prosecutor data and time allocated to each case. The court data other than process outcomes are noticeably lacking. Thus all comments here about efficiency are relative to the efficiency analysis performed and could change depending on the inputs and/or outputs used in future research. This limitation fits with the earlier literature on court politics that found courts were lacking in their use of applied and available statistics as compared to police and correction departments. Even this comprehensive study is limited by the dearth of available court data. This difficulty also relates to the first limitation, in that SRS data have no information on quality such as rate of appeals and cases reopened, a fact that hampers the courts because while they may be more technically efficient, they do not have a data reporting system that would allow greater analysis. Results could vary if different measures were incorporated.

Another methodological limitation is that case weights were not controlled for on the circuit level. Case weights are important to efficiency outcomes on a practical level but are hard to model on the holistic, organizational level. Future studies should include weighted cases as a control variable to further clarify the impacts of Revision 7 period and circuit size. Additionally, since resource dependency theory was utilized, including the lagged effects of the two recessions this past decade on court resources could further explain the variance of efficiency outcomes, especially as courts could become more efficient due to the recession than other factors. Again, the lagged onset and effects are difficult to model but can be included if reliably and validly attained.

A third limitation is statistical: the ANOVA and ANCOVA models each had slight violations of assumptions that underlie their precise use. As such, the results may be limited somewhat in their conclusion validity. Where possible, the control variables included, all derived from prior literature, were used as an enhancement methodology to increase this important validity type. Additionally, all assumptions were analyzed and violations presented. Additionally, as displayed in Appendix C, non-parametric analyses were also conducted to confirm the findings, with Kruskal-Wallis tests replicating the parametric results. Furthermore, the application of truncated ANOVA and regression may be more applicable to IOTA and TFPCH scores than traditional statistical techniques used in this analysis. A replication study using truncated techniques should be conducted to replicate or clarify the findings of the present study.

The focus on technical efficiency is limited by not taking into account actual dollars, which are often the focus of policy makers when they speak of efficiency. Thus a court in this study may be more technically efficient than other circuits but use more fiscal resources to reach that benchmark. Future research could and should analyze the allocative efficiency of the courts, but to do so would require much more clarity and availability of information about court revenues, allocations and expenditures that simply is not accessible or available now.

Another limitation is the validity threat of history when analyzing policy interventions over a fifteen year time frame. Changes to personnel such as state attorneys and chief judges in each circuit could affect efficiency outcomes, as could workgroups that have long-term consistency with little turnover. Other external factors such as recessions in the state economy could also affect efficiency outcomes separately and apart from Revision 7, but these are hard to model in terms of their onset and lagged effects. Other state policies could also have had an impact. Thus, the findings of the present work must be understood within the context of other historical factors influencing efficiency concurrently with Revision 7 intervention periods. The courts' technology should have increased greatly over this period, since the study interval paralleled the rise of the internet, cell phones, software programs and other technological advances which should have improved efficiency. In other words, courts should have been able to do more with less simply through those advances. The MPI found circuits to be less innovative over this period (TECHCH=.982), with most of the innovation increases occurring earlier in the analysis (1996/97, 1998/99 and 2000/01). Thus the results here could have been influenced by factors that were not studied.

It must also be noted that dispositions were analyzed without taking into account the types of dispositions in the criminal, civil or family divisions of the court. Thus, viewing the circuit holistically may mask differences between the court divisions in terms of efficiency. This decision was made due to the problem of accurately determining proper case weights and not having information about the breakdown of judicial assignment within circuits, which was only available after 2004/05. As a result, future research could determine technical efficiency while including case weights as a non-controllable input variable and comparing the results to those in this study.

A final limitation of this study is the use of secondary data. Though a valid source, the SRS data may not be as reliable as reported. For example, the year 1993/94 was chosen as the baseline year despite the fact that data are available dating back to 1986/87, because the Fourth Circuit had dispositions by far exceeding its filings in all court divisions over several years. This limitation ties directly to the court data available. Any errors resulting from this limitation come from the SRS as a source in and of itself. While a valid source, there is weakness in its potential reliability, but this is no different from the use of crime rates in the study of policing. Overall, it is a weakness that must be noted.

Conclusion

In terms of the Revision 7 intervention periods the Florida circuit courts overall have not become more efficient as was expected. While a few circuits increased their technical efficiency over that time, the system and most circuits did not. The circuit size of a court had an interaction effect with the Revision 7 periods: small and medium-sized circuits became less efficient over time, while large circuits stayed fairly stable. In all the analysis of variance models these interactions took place after the enactment of Revision 7. In general, inefficiencies were identified throughout the Florida system, with the average IOTA score .76 and just three of three hundred DMU's achieving technical efficiency. As there were no previous published studies with which to compare these results, the study creates a body of empirical benchmarks that can serve that purpose as well as others.

Another major finding is that no circuits increased their productivity over the policy cycle of Revision 7; indeed only one circuit did not decline in productivity. Systemwide there was a 2.7% productivity loss, with small and medium-sized circuits having TFPCH of -3.4% and -3.3% respectively, and large circuits with TFPCH of -1.6%. The largest productivity losses followed the Revision 7 intervention years, which coincided with large additions of judgeships to the system. Hierarchal regression analysis analysis revealed that, while controlling for other factors, the addition of judges to circuits accounts for a significant 32.2% of the variance in TFPCH. Further analysis of covariance tests revealed these losses to occur in greater intensity as each additional judge is added to a circuit. When no judges are added, circuits become more productive, but the addition of a single judge correlates with productivity loss. When three or more judges are added to a circuit in a given year, productivity declines deeply. These results confirm the findings of Beenstock and Haitovsky (2004) that increasing judgeships has the effect of reducing productivity of the existing judges in circuits of all size categories, but especially in small and medium-sized circuits.

In theoretical contributions this study found courts not to act as expected in a resource-dependent relationship with the state. Rather than increasing productivity or efficiency in response to Revision 7, the courts acted more institutional than as a part of an open-natural system. While it would be presumptuous to state that the courts resisted becoming more efficient, there must be a reason that they have not. In essence, courts may represent a certain type of organizational system for which a new theoretical framework is needed: institutional governmental organizations that are resource-dependent upon the state and define their survival by standards other than existence or performance. Such a standard may be independence. This work provides evidence that current organizational frameworks may not fully relate to courts, implying that a new approach may be needed for studying court response to external pressures to be more efficient.

This study concludes by presenting historic court performance benchmarks on the dimensions of technical efficiency and productivity by circuit, by system and by categorical grouping of circuits based on size and Revision 7 period. The best performing court in terms of technical efficiency over the policy span is the Ninth Circuit. The Fifteenth Circuit is the only circuit in the state not to have had a productivity decline.

The resulting policy recommendations suggest: that efficiency and productivity outcomes should be included in court resource allocation decisions; that there is room for efficiency and productivity gains in the Florida system and within many circuits; that fuller court data should be collected and available on court structures, processes and outcomes; that courts should analyze their use of technology to determine the benefit obtained for the cost; and that the current policy of holding judgeships flat is supported by this study's objective, quantitative analysis. Weaknesses of the study include the sole focus on efficiency and productivity without the reference to quality or effectiveness of the courts' work, limits on the data available and its potential data reliability issues, the methodological concern of relying on a single input/output analysis, and the threat to validity of history over the study of a fifteen-year period.

APPENDIX A: LIST OF CIRCUITS BY COMPRISING COUNTIES

First: Escambia, Okaloosa, Santa Rosa, Walton

Second: Franklin, Gadsden, Jefferson, Leon, Liberty, Wakulla

Third: Columbia, Dixie, Hamilton, Lafayette, Madison, Suwannee, Taylor

Fourth: Clay, Duval, Nassau

Fifth: Citrus, Hernando, Lake, Marion, Sumter

Sixth: Pasco, Pinellas

Seventh: Flagler, Putnam, St. Johns, Volusia

Eighth: Alachua, Baker, Bradford, Gilchrist, Levy, Union

Ninth: Orange, Osceola

Tenth: Hardee, Highlands, Polk

Eleventh: Miami-Dade

Twelfth: Desoto, Manatee, Sarasota

Thirteenth: Hillsborough

Fourteenth: Bay, Calhoun, Gulf, Holmes, Jackson, Washington

Fifteenth: Palm Beach

Sixteenth: Monroe

Seventeenth: Broward

Eighteenth: Brevard, Seminole

Nineteenth: Indian River, Martin, Okeechobee, St. Lucie

Twentieth: Charlotte, Collier, Glades, Hendry, Lee

APPENDIX B: FULL CIRCUIT DATA, DEA AND TFPCH RESULTS

Table A: Data for Each Circuit, 1993/94 to 2007/08

Circuit	Year	Judges	Filings/Judge	Dispositions/Judge	Clearance Rate Δ	% Change from prior Year Filings	Circuit Population	IOTA Score	TFPCH
First	1	19	1444	1300	-.07	.03	547422	0.73	-
Second	1	11	1411	1291	-.03	.06	293425	0.73	-
Third	1	5	1391	1199	-.08	.11	138735	0.68	-
Fourth	1	28	1384	1253	-.03	.00	862976	0.71	-
Fifth	1	16	1528	1471	.00	.08	625530	0.83	-
Sixth	1	36	1299	1154	-.05	.04	1158919	0.65	-
Seventh	1	19	1447	1429	.01	.06	582432	0.81	-
Eighth	1	9	1390	1488	.08	-.02	284483	0.84	-
Ninth	1	27	1781	1770	-.03	.05	853455	1	-
Tenth	1	16	1482	1403	.01	.01	525181	0.79	-
Eleventh	1	66	1402	1315	-.04	.06	1951116	0.74	-
Twelfth	1	15	1417	1327	-.07	.04	539581	0.75	-
Thirteenth	1	32	1408	1356	-.07	.05	866134	0.77	-
Fourteenth	1	7	1733	1559	-.04	.01	236202	0.88	-
Fifteenth	1	31	1170	1172	-.04	-.06	918223	0.66	-
Sixteenth	1	4	1224	1267	.02	-.02	81766	1	-
Seventeenth	1	44	1270	1200	-.09	.08	1317512	0.68	-
Eighteenth	1	19	1515	1452	-.02	-.01	737925	0.82	-
Nineteenth	1	12	1402	1427	.03	.10	397371	0.81	-
Twentieth	1	18	1438	1376	-.02	-.01	690239	0.78	-
First	2	19	1494	1455	.07	.04	561058	0.82	1.119
Second	2	11	1486	1423	.04	.05	303019	0.8	1.102
Third	2	5	1362	1237	.05	-.02	143319	0.7	1.032
Fourth	2	28	1383	1338	.06	.00	875742	0.76	1.068
Fifth	2	17	1556	1458	-.02	.08	641941	0.82	0.933
Sixth	2	36	1331	1192	.01	.02	1169574	0.67	1.033
Seventh	2	19	1520	1464	-.03	.05	595661	0.83	1.024
Eighth	2	9	1548	1458	-.13	.11	290960	0.82	0.98
Ninth	2	29	1774	1752	.00	.07	871278	0.99	0.922
Tenth	2	16	1554	1445	-.02	.05	535518	0.82	1.03
Eleventh	2	68	1369	1313	.02	.01	1990445	0.74	0.969
Twelfth	2	16	1360	1217	-.04	.02	550545	0.69	0.86
Thirteenth	2	32	1381	1341	.01	-.02	879069	0.76	0.989
Fourteenth	2	8	1520	1414	.03	.00	241581	0.8	0.794
Fifteenth	2	31	1175	1112	-.05	.00	937190	0.63	0.949
Sixteenth	2	4	1190	1099	-.12	-.03	82252	0.87	0.867
Seventeenth	2	44	1322	1270	.01	.04	1340220	0.72	1.058
Eighteenth	2	20	1456	1378	-.01	.01	752888	0.78	0.902
Nineteenth	2	12	1474	1533	.02	.05	406770	0.87	1.074
Twentieth	2	18	1546	1435	-.03	.08	709885	0.81	1.043

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Table A, Continued

Circuit	Year	Judges	Filings/Judge	Dispositions/Judge	Clearance Rate Δ	% Change from prior Year Filings	Circuit Population	IOTA Score	TFPCH
First	3	19	1434	1460	.05	-.04	574995	0.82	1.003
Second	3	11	1605	1367	-.11	.08	309890	0.77	0.961
Third	3	5	1500	1299	-.04	.10	149006	0.73	1.05
Fourth	3	28	1427	1257	-.09	.03	888378	0.71	0.939
Fifth	3	18	1513	1386	-.02	.03	661362	0.78	0.898
Sixth	3	37	1273	1135	-.01	-.02	1181776	0.64	0.926
Seventh	3	20	1404	1439	.06	-.03	607671	0.81	0.934
Eighth	3	9	1580	1536	.03	.02	297250	0.87	1.053
Ninth	3	32	1661	1563	-.05	.03	895589	0.88	0.808
Tenth	3	17	1449	1425	.05	-.01	543308	0.81	0.928
Eleventh	3	70	1309	1252	.00	-.02	2013821	0.71	0.926
Twelfth	3	16	1395	1284	.02	.03	561328	0.73	1.055
Thirteenth	3	32	1401	1353	.00	.01	892874	0.77	1.009
Fourteenth	3	9	1384	1289	.00	.02	247404	0.73	0.81
Fifteenth	3	31	1203	1087	-.05	.02	962802	0.61	0.978
Sixteenth	3	4	1113	1015	-.01	-.06	83401	0.8	0.924
Seventeenth	3	45	1311	1239	-.01	.01	1364168	0.7	0.954
Eighteenth	3	21	1380	1246	-.05	.00	769122	0.7	0.861
Nineteenth	3	12	1589	1532	-.08	.08	416312	0.87	0.999
Twentieth	3	19	1457	1287	-.05	-.01	728900	0.73	0.85
First	4	19	1452	1349	-.09	.01	584439	0.76	0.924
Second	4	11	1747	1678	.11	.09	317495	0.95	1.228
Third	4	5	1643	1512	.05	.10	154801	0.85	1.164
Fourth	4	28	1467	1325	.02	.03	904965	0.75	1.054
Fifth	4	18	1569	1478	.02	.04	679982	0.84	1.066
Sixth	4	37	1389	1372	.10	.09	1191319	0.78	1.209
Seventh	4	20	1449	1463	-.01	.03	618267	0.83	1.017
Eighth	4	10	1472	1485	.04	.04	303695	0.84	0.87
Ninth	4	32	1780	1637	-.02	.07	917280	0.92	1.047
Tenth	4	18	1410	1276	-.07	.03	553222	0.72	0.846
Eleventh	4	70	1385	1439	.08	.06	2043316	0.81	1.149
Twelfth	4	17	1422	1279	-.02	.08	569342	0.72	0.938
Thirteenth	4	33	1380	1366	.02	.02	910855	0.77	0.979
Fourteenth	4	9	1356	1237	-.02	-.02	254000	0.7	0.96
Fifteenth	4	31	1238	1223	.09	.03	981793	0.69	1.125
Sixteenth	4	4	1113	992	-.02	.00	83789	0.78	0.977
Seventeenth	4	45	1470	1379	-.01	.12	1392252	0.78	1.113
Eighteenth	4	21	1415	1267	.00	.03	779195	0.72	1.017
Nineteenth	4	13	1478	1399	-.01	.01	425776	0.79	0.843
Twentieth	4	20	1447	1366	.06	.05	745780	0.77	1.008

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Table A, Continued

Circuit	Year	Judges	Filings/Judge	Dispositions/Judge	Clearance Rate Δ	% Change from prior Year Filings	Circuit Population	IOTA Score	TFPCH
First	5	19	1493	1350	-.03	.03	600605	0.76	1.001
Second	5	12	1790	1555	-.09	.12	328293	0.88	0.849
Third	5	5	1789	1526	-.07	.09	158875	0.86	1.009
Fourth	5	29	1377	1295	.04	-.03	922174	0.73	0.944
Fifth	5	20	1428	1351	.01	.01	701984	0.76	0.823
Sixth	5	37	1340	1294	-.02	-.04	1203926	0.73	0.943
Seventh	5	21	1335	1283	-.05	-.03	631066	0.72	0.835
Eighth	5	10	1496	1514	.00	.02	311719	0.86	1.02
Ninth	5	33	1670	1545	.01	-.03	947442	0.87	0.915
Tenth	5	18	1596	1395	-.04	.13	560993	0.79	1.093
Eleventh	5	70	1372	1312	-.08	-.01	2070573	0.74	0.912
Twelfth	5	17	1518	1388	.01	.07	579689	0.78	1.085
Thirteenth	5	33	1449	1367	-.05	.05	928731	0.77	1.001
Fourteenth	5	9	1414	1220	-.05	.04	258675	0.69	0.986
Fifteenth	5	31	1282	1256	-.01	.04	1003798	0.71	1.027
Sixteenth	5	4	1217	940	-.12	.09	84743	0.74	0.948
Seventeenth	5	46	1485	1450	.04	.03	1423729	0.82	1.029
Eighteenth	5	21	1452	1338	.02	.03	795533	0.76	1.056
Nineteenth	5	13	1579	1499	.00	.07	434843	0.85	1.071
Twentieth	5	20	1463	1347	-.02	.01	765531	0.76	0.986
First	6	19	1458	1423	.08	-.02	617850	0.8	1.054
Second	6	12	1759	1622	.05	-.02	336534	0.92	1.043
Third	6	5	1773	1771	.15	-.01	162232	1	1.161
Fourth	6	29	1416	1454	.09	.03	942895	0.82	1.123
Fifth	6	20	1505	1360	-.05	.05	723769	0.77	1.007
Sixth	6	37	1366	1243	-.06	.02	1213252	0.7	0.961
Seventh	6	21	1311	1271	.01	-.02	645220	0.72	0.991
Eighth	6	10	1491	1425	-.05	.00	316904	0.81	0.941
Ninth	6	33	1693	1428	-.09	.01	972807	0.81	0.924
Tenth	6	18	1551	1480	.08	-.03	569117	0.84	1.061
Eleventh	6	70	1376	1305	-.01	.00	2090314	0.74	0.995
Twelfth	6	17	1627	1442	-.02	.07	590978	0.81	1.039
Thirteenth	6	33	1444	1456	.07	.00	942322	0.82	1.065
Fourteenth	6	9	1460	1322	.05	.03	264266	0.75	1.084
Fifteenth	6	31	1368	1332	-.01	.07	1020521	0.75	1.061
Sixteenth	6	4	1127	861	-.01	-.07	85646	0.68	0.916
Seventeenth	6	46	1500	1459	-.01	.01	1460890	0.82	1.006
Eighteenth	6	21	1445	1294	-.02	-.01	810991	0.73	0.967
Nineteenth	6	13	1577	1545	.03	.00	444341	0.87	1.031
Twentieth	6	20	1405	1333	.03	-.04	789626	0.75	0.99

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Table A, Continued

Circuit	Year	Judges	Filings/Judge	Dispositions/Judge	Clearance Rate Δ	% Change from prior Year Filings	Circuit Population	IOTA Score	TFPCH
First	7	20	1457	1356	-.05	.05	634299	0.77	0.905
Second	7	13	1435	1335	.01	-.12	343107	0.75	0.76
Third	7	6	1435	1447	.01	-.03	165183	0.82	0.681
Fourth	7	30	1424	1236	-.16	.04	959858	0.7	0.822
Fifth	7	22	1444	1284	-.01	.05	746409	0.73	0.858
Sixth	7	39	1349	1216	-.01	.04	1225278	0.69	0.928
Seventh	7	22	1286	1235	-.01	.03	659457	0.7	0.928
Eighth	7	11	1432	1366	-.01	.06	324275	0.77	0.871
Ninth	7	35	1593	1387	.03	.00	1003704	0.78	0.916
Tenth	7	19	1569	1385	-.07	.07	578441	0.78	0.887
Eleventh	7	71	1362	1303	.01	.00	2126702	0.74	0.984
Twelfth	7	18	1424	1273	.00	-.07	602689	0.72	0.834
Thirteenth	7	35	1389	1355	-.03	.02	967511	0.77	0.877
Fourteenth	7	9	1489	1217	-.09	.02	269162	0.69	0.921
Fifteenth	7	32	1280	1313	.06	-.03	1042196	0.74	0.955
Sixteenth	7	4	1213	1060	.11	.08	87030	0.84	1.231
Seventeenth	7	49	1400	1380	.02	-.01	1490289	0.78	0.888
Eighteenth	7	22	1374	1149	-.06	.00	828951	0.65	0.848
Nineteenth	7	15	1272	1191	-.04	-.07	453508	0.67	0.668
Twentieth	7	21	1429	1305	-.04	.07	813991	0.74	0.932
First	8	20	1552	1391	-.03	.07	623252	0.79	1.026
Second	8	13	1380	1309	.02	-.04	338382	0.74	0.981
Third	8	6	1314	1223	-.08	-.08	163522	0.69	0.845
Fourth	8	30	1423	1273	.03	.00	977356	0.72	1.03
Fifth	8	22	1524	1408	.03	.06	771676	0.8	1.097
Sixth	8	39	1383	1250	.00	.03	1226247	0.71	1.028
Seventh	8	22	1321	1337	.05	.03	686733	0.76	1.083
Eighth	8	11	1552	1452	-.01	.08	328631	0.82	1.063
Ninth	8	35	1677	1438	-.01	.05	1068837	0.81	1.037
Tenth	8	19	1730	1503	-.01	.10	598228	0.85	1.085
Eleventh	8	71	1445	1341	-.03	.06	2253326	0.76	1.029
Twelfth	8	18	1381	1257	.02	-.03	622168	0.71	0.987
Thirteenth	8	35	1400	1415	.03	.01	998948	0.8	1.044
Fourteenth	8	9	1428	1256	.06	-.04	260858	0.71	1.032
Fifteenth	8	32	1342	1301	-.06	.05	1131184	0.74	0.991
Sixteenth	8	4	1233	1198	.10	.02	79589	0.95	1.13
Seventeenth	8	49	1438	1392	-.02	.03	1623018	0.79	1.009
Eighteenth	8	22	1380	1291	.10	.00	841286	0.73	1.124
Nineteenth	8	15	1295	1224	.01	.02	468283	0.69	1.028
Twentieth	8	21	1636	1454	-.02	.14	880678	0.82	1.114

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Table A, Continued

Circuit	Year	Judges	Filings/Judge	Dispositions/Judge	Clearance Rate Δ	% Change from prior Year Filings	Circuit Population	IOTA Score	TFPCH
First	9	21	1508	1406	.03	.02	634071	0.79	0.963
Second	9	15	1180	1123	.00	-.01	344671	0.63	0.744
Third	9	6	1426	1194	-.09	.08	165991	0.67	0.976
Fourth	9	31	1470	1229	-.06	.07	996145	0.69	0.934
Fifth	9	23	1528	1401	.00	.05	794765	0.79	0.952
Sixth	9	40	1394	1180	-.05	.03	1281558	0.67	0.92
Seventh	9	23	1338	1234	-.09	.06	704535	0.7	0.883
Eighth	9	11	1529	1331	-.07	-.01	334915	0.75	0.917
Ninth	9	36	1670	1420	-.01	.02	1109568	0.8	0.96
Tenth	9	20	1658	1428	-.01	.01	611245	0.81	0.903
Eleventh	9	72	1409	1356	.03	-.01	2285869	0.77	0.997
Twelfth	9	18	1250	1100	-.03	-.10	637530	0.62	0.875
Thirteenth	9	36	1476	1370	-.08	.08	1026906	0.77	0.941
Fourteenth	9	9	1523	1414	.05	.07	265958	0.8	1.126
Fifteenth	9	33	1379	1262	-.05	.06	1154464	0.71	0.941
Sixteenth	9	4	1126	1182	.08	-.09	80588	0.93	0.987
Seventeenth	9	51	1467	1388	-.02	.06	1649925	0.78	0.958
Eighteenth	9	23	1325	1202	-.03	.00	863138	0.68	0.891
Nineteenth	9	15	1382	1262	-.04	.07	478989	0.71	1.031
Twentieth	9	22	1630	1409	-.02	.04	910878	0.8	0.925
First	10	21	1529	1488	.04	.01	646933	0.84	1.058
Second	10	15	1236	1238	.05	.05	348746	0.7	1.102
Third	10	6	1462	1316	.06	.03	168420	0.74	1.102
Fourth	10	31	1435	1335	.09	-.02	1020389	0.75	1.086
Fifth	10	25	1366	1336	.06	-.03	823008	0.75	0.877
Sixth	10	41	1412	1301	.07	.04	1295462	0.74	1.076
Seventh	10	24	1321	1280	.05	.03	721804	0.72	0.994
Eighth	10	12	1395	1405	.14	.00	342946	0.79	0.968
Ninth	10	38	1517	1369	.05	-.04	1149220	0.77	0.913
Tenth	10	22	1431	1393	.11	-.05	618860	0.79	0.887
Eleventh	10	74	1345	1299	.01	-.02	2312478	0.73	0.932
Twelfth	10	19	1299	1236	.07	.10	649844	0.7	1.064
Thirteenth	10	37	1461	1470	.08	.02	1055617	0.83	1.044
Fourteenth	10	9	1540	1467	.02	.01	268683	0.83	1.037
Fifteenth	10	34	1314	1234	.02	-.02	1183197	0.7	0.949
Sixteenth	10	4	1052	1045	-.06	-.07	81140	0.83	0.884
Seventeenth	10	53	1410	1463	.09	.00	1669553	0.83	1.014
Eighteenth	10	24	1242	1167	.03	-.02	881728	0.66	0.93
Nineteenth	10	15	1394	1257	-.01	.01	489111	0.71	0.996
Twentieth	10	23	1626	1545	.08	.04	947869	0.87	1.049

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Table A, Continued

Circuit	Year	Judges	Filings/Judge	Dispositions/Judge	Clearance Rate Δ	% Change from prior Year Filings	Circuit Population	IOTA Score	TFPCH
First	11	21	1548	1492	-.01	.01	660367	0.84	1.003
Second	11	15	1238	1172	-.05	.00	358188	0.66	0.947
Third	11	6	1424	1358	.05	-.03	171939	0.77	1.032
Fourth	11	31	1491	1215	-.11	.04	1045352	0.69	0.91
Fifth	11	25	1487	1445	-.01	.09	852157	0.82	1.082
Sixth	11	41	1399	1275	-.01	-.01	1315182	0.72	0.98
Seventh	11	24	1418	1349	-.02	.07	744131	0.76	1.054
Eighth	11	12	1270	1185	-.08	-.09	347558	0.67	0.843
Ninth	11	38	1595	1368	-.04	.05	1193603	0.77	0.999
Tenth	11	22	1580	1379	-.10	.10	629722	0.78	0.99
Eleventh	11	74	1295	1307	.04	-.04	2345932	0.74	1.006
Twelfth	11	19	1354	1342	.04	.04	669358	0.76	1.086
Thirteenth	11	37	1494	1365	-.10	.02	1079587	0.77	0.929
Fourteenth	11	9	1648	1494	-.04	.07	273725	0.84	1.018
Fifteenth	11	34	1341	1280	.02	.02	1211448	0.72	1.037
Sixteenth	11	4	1041	961	-.07	-.01	80537	0.76	0.92
Seventeenth	11	53	1333	1366	-.01	-.06	1698425	0.77	0.934
Eighteenth	11	24	1432	1346	.00	.15	902710	0.76	1.153
Nineteenth	11	15	1466	1349	.02	.05	504799	0.76	1.073
Twentieth	11	23	1644	1458	-.06	.01	986788	0.82	0.944
First	12	21	1534	1432	-.03	-.01	677268	0.81	0.96
Second	12	15	1117	1111	.04	-.10	368325	0.63	0.948
Third	12	6	1396	1259	-.05	-.02	175371	0.71	0.927
Fourth	12	31	1447	1262	.05	-.03	1068951	0.71	1.039
Fifth	12	25	1489	1430	-.01	.00	885928	0.81	0.99
Sixth	12	41	1393	1296	.02	.00	1333416	0.73	1.016
Seventh	12	24	1368	1333	.02	-.04	760891	0.75	0.988
Eighth	12	12	1228	1216	.06	-.03	355883	0.69	1.026
Ninth	12	38	1520	1459	.10	-.05	1239753	0.82	1.067
Tenth	12	22	1501	1419	.08	-.05	648233	0.8	1.029
Eleventh	12	74	1270	1264	-.01	-.02	2379818	0.71	0.967
Twelfth	12	19	1312	1250	-.04	-.03	483743	0.71	0.931
Thirteenth	12	37	1558	1470	.03	.04	1108435	0.83	1.077
Fourteenth	12	9	1583	1433	.00	-.04	278534	0.81	0.959
Fifteenth	12	34	1201	1187	.03	-.10	1242270	0.67	0.927
Sixteenth	12	4	964	923	.04	-.07	81236	0.73	0.96
Seventeenth	12	53	1315	1249	-.08	-.01	1723131	0.71	0.914
Eighteenth	12	24	1242	1140	-.02	-.13	747638	0.64	0.847
Nineteenth	12	15	1382	1381	.08	-.06	655717	0.78	1.024
Twentieth	12	23	1583	1480	.05	-.04	1032551	0.84	1.015

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Table A, Continued

Circuit	Year	Judges	Filings/Judge	Dispositions/Judge	Clearance Rate Δ	% Change from prior Year Filings	Circuit Population	IOTA Score	TFPCH
First	13	22	1473	1347	-.02	.01	682530	0.76	0.898
Second	13	16	1100	1018	-.06	.05	378350	0.58	0.859
Third	13	7	1182	1063	.00	-.01	178309	0.6	0.724
Fourth	13	32	1459	1365	.07	.04	1096532	0.77	1.048
Fifth	13	28	1442	1380	.00	.08	925414	0.8	0.862
Sixth	13	44	1298	1246	.03	.00	1354642	0.7	0.896
Seventh	13	26	1327	1267	-.02	.05	804308	0.72	0.877
Eighth	13	13	1165	1098	-.05	.03	362087	0.62	0.834
Ninth	13	40	1627	1582	.01	.13	1278593	0.89	1.03
Tenth	13	26	1309	1242	.00	.03	662629	0.7	0.741
Eleventh	13	77	1207	1202	.00	-.01	2422075	0.7	0.914
Twelfth	13	19	1298	1223	-.01	-.01	704837	0.69	0.978
Thirteenth	13	41	1382	1468	.12	-.02	1131546	0.83	0.901
Fourteenth	13	10	1476	1336	.00	.04	284090	0.75	0.839
Fifteenth	13	35	1203	1147	-.04	.03	1265900	0.65	0.939
Sixteenth	13	4	975	923	-.01	.01	82413	0.73	1
Seventeenth	13	56	1226	1163	.00	-.02	1740987	0.66	0.881
Eighteenth	13	25	1310	1135	-.05	.10	943714	0.64	0.956
Nineteenth	13	18	1238	1117	-.10	.07	548906	0.63	0.674
Twentieth	13	25	1558	1345	-.08	.07	1070365	0.76	0.836
First	14	24	1428	1288	-.01	.06	699533	0.73	0.877
Second	14	16	1093	1060	.04	-.01	383126	0.6	1.041
Third	14	7	1275	1123	-.02	.08	181876	0.63	1.056
Fourth	14	35	1390	1221	-.06	.04	1124324	0.69	0.818
Fifth	14	31	1368	1283	-.02	.05	968211	0.72	0.84
Sixth	14	45	1363	1267	-.03	.07	1372457	0.72	0.994
Seventh	14	27	1329	1203	-.04	.04	832626	0.68	0.914
Eighth	14	13	1108	1122	.07	-.05	368046	0.63	1.022
Ninth	14	43	1620	1464	-.07	.07	1335427	0.83	0.861
Tenth	14	28	1257	1176	-.01	.03	688907	0.66	0.879
Eleventh	14	80	1297	1220	-.06	.12	2437022	0.69	0.977
Twelfth	14	21	1352	1145	-.09	.15	720875	0.65	0.847
Thirteenth	14	45	1330	1304	-.08	.06	1164425	0.74	0.809
Fourteenth	14	11	1356	1218	-.01	.01	288958	0.69	0.829
Fifteenth	14	35	1386	1213	-.07	.15	1287987	0.69	1.058
Sixteenth	14	4	1099	927	-.11	.13	80510	0.73	1.004
Seventeenth	14	58	1352	1249	-.03	.14	1753162	0.71	1.037
Eighteenth	14	26	1333	1067	-.07	.06	963717	0.6	0.904
Nineteenth	14	19	1299	1138	-.02	.11	575888	0.64	0.965
Twentieth	14	31	1529	1168	-.10	.22	1122055	0.66	0.7

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Table A, Continued

Circuit	Year	Judges	Filings/Judge	Dispositions/Judge	Clearance Rate Δ	% Change from prior Year Filings	Circuit Population	IOTA Score	TFPCH
First	15	24	1504	1326	-.02	.05	707552	0.75	1.03
Second	15	16	1145	1048	-.05	.05	386226	0.59	0.989
Third	15	7	1323	1183	.01	.04	186169	0.67	1.053
Fourth	15	35	1560	1246	-.08	.12	1151810	0.7	1.02
Fifth	15	31	1603	1383	-.08	.17	1003610	0.78	1.078
Sixth	15	45	1540	1301	-.08	.13	1378624	0.74	1.027
Seventh	15	27	1558	1263	-.10	.17	850316	0.71	1.05
Eighth	15	13	1220	1119	-.09	.10	375112	0.63	0.997
Ninth	15	43	2051	1598	-.12	.27	1371726	0.9	1.092
Tenth	15	28	1417	1241	-.06	.13	707305	0.7	1.055
Eleventh	15	80	1643	1329	-.13	.27	2462292	0.75	1.089
Twelfth	15	21	1801	1369	-.09	.33	737334	0.77	1.196
Thirteenth	15	45	1589	1333	-.14	.19	1192861	0.75	1.022
Fourteenth	15	11	1486	1361	.02	.10	292522	0.77	1.117
Fifteenth	15	35	1838	1323	-.16	.33	1295033	0.75	1.091
Sixteenth	15	4	1215	987	-.03	.11	78987	0.8	1.065
Seventeenth	15	58	1751	1418	-.11	.30	1765707	0.8	1.135
Eighteenth	15	26	1718	1214	-.09	.29	977807	0.69	1.138
Nineteenth	15	19	1791	1375	-.11	.38	594485	0.78	1.208
Twentieth	15	31	2416	1573	-.11	.58	1164889	0.89	1.347

APPENDIX C: FULL ASSUMPTION VALIDATION INFORMATION

I. Hierarchal Regression Analysis Assumption Validations (Efficiency Model)

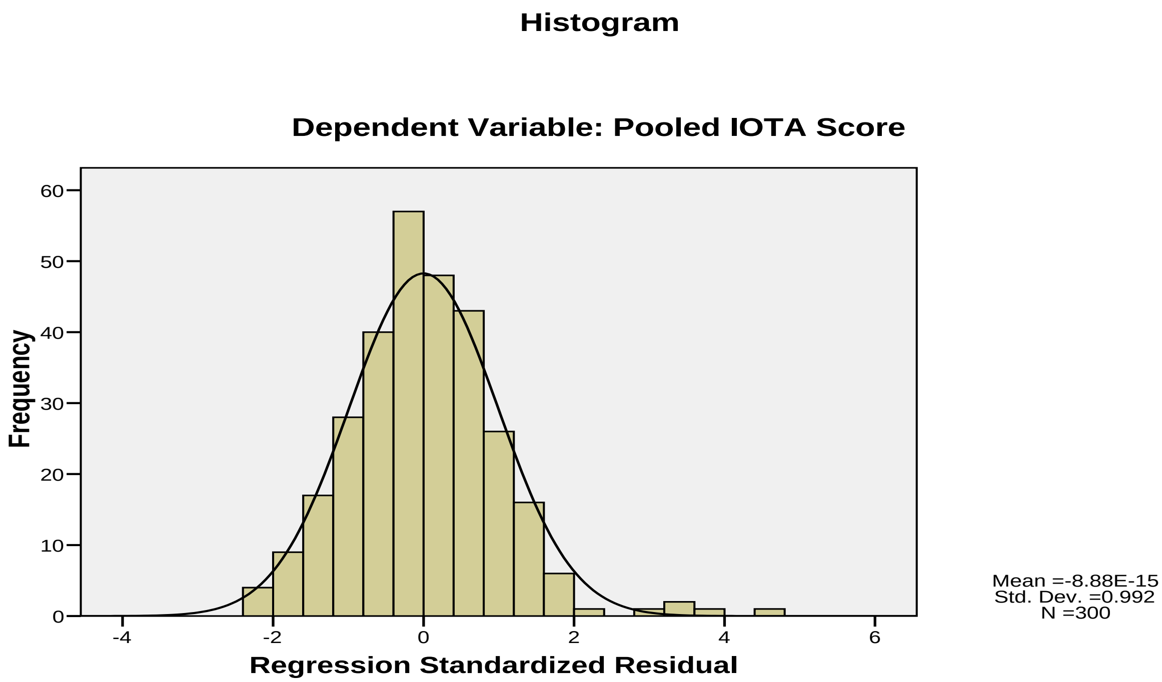

Figure 3: Histogram of Pooled IOTA Score Residual Error Values

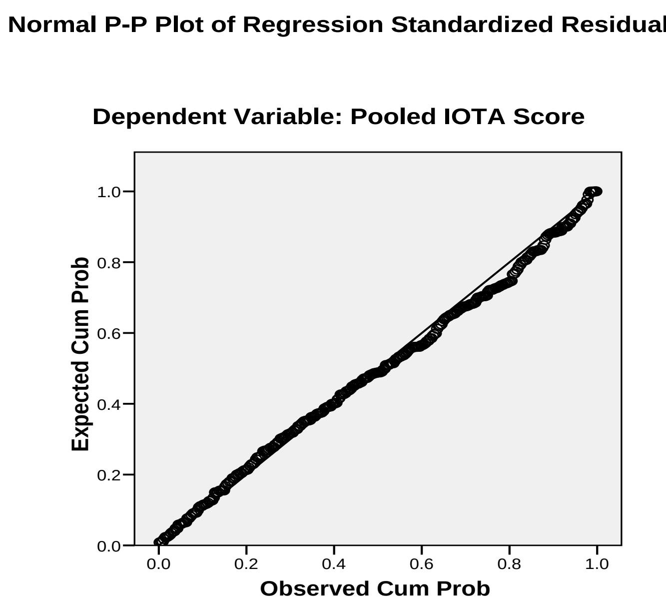

Figure 4: P-P Plot of Pooled IOTA Score Residual

Dependent Variable: Pooled IOTA Score

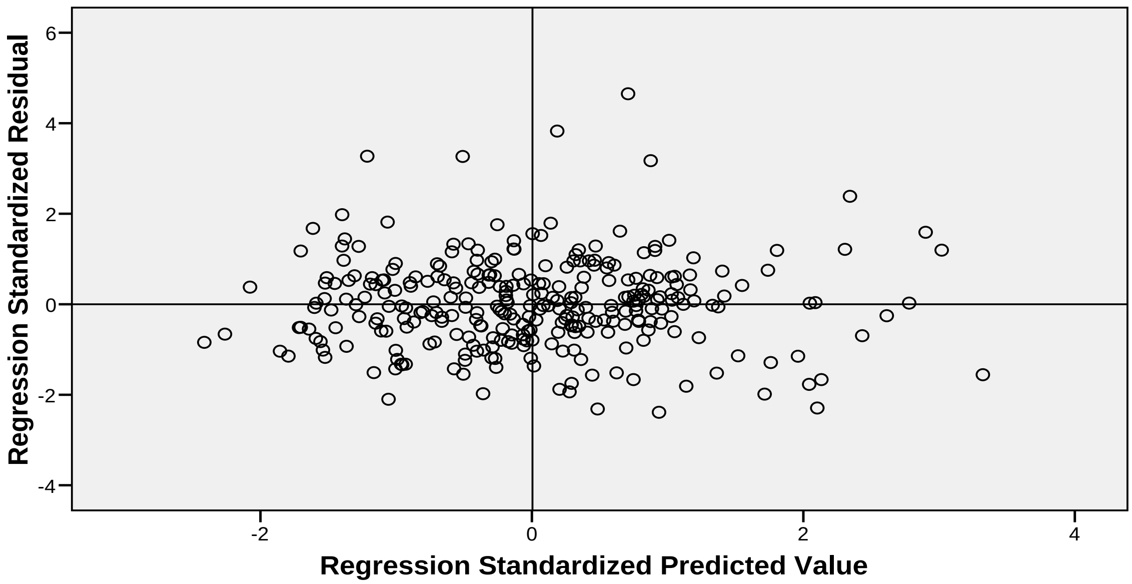

Figure 5: Scatterplot of Pooled IOTA Score Residual

Table 19: Descriptive Statistics for Variable Distribution in Technical Efficiency Model

	N		Mean		Std. Deviation		Skewness		Kurtosis	
	Statistic	S.E.	Statistic	S.E.	Statistic	S.E.	Statistic	S.E.	Statistic	S.E.
Pooled IOTA Score	300		.7562		.07375		.437	.141	.700	.281
Total Circuit Population	300		797663.81		505266.642		1.044	.141	1.301	.281
Change in the Year Over Year Clearance Rate	300		-.0108		.05637		.059	.141	-.152	.281
Filings Per Judge	300		1427.46		167.916		.821	.141	4.166	.281
Valid N (listwise)	300									

II. Analysis of Variance and Analysis of Covariance Validations (Efficiency Model)

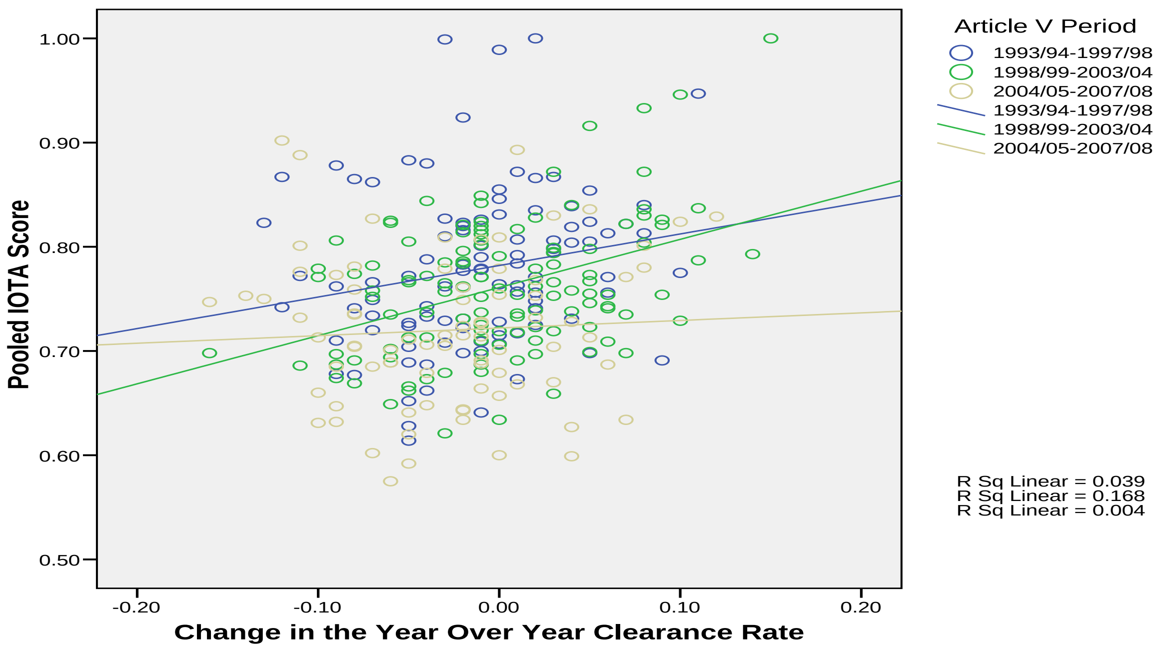

Figure 6: Scatterplot of Homogeneity of Regression Slopes of Covariate, Clearance Rate Change and Revision 7 Period

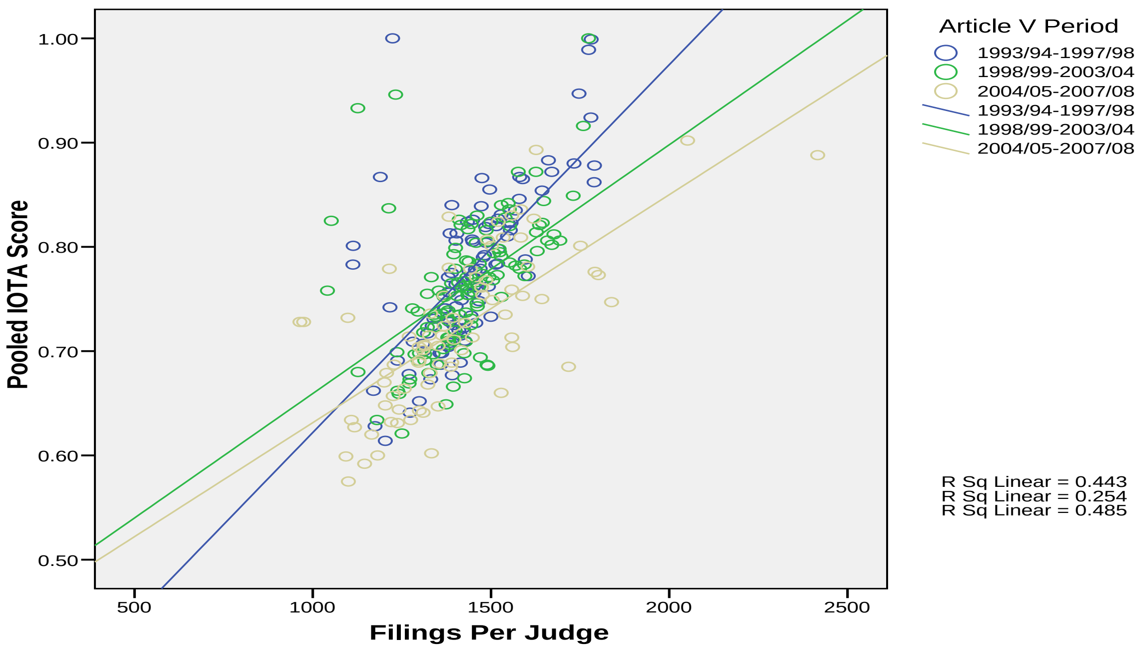

Figure 7: Homogeneity of Regression Slopes of Covariate, Filings per Judge and Revision 7 Period

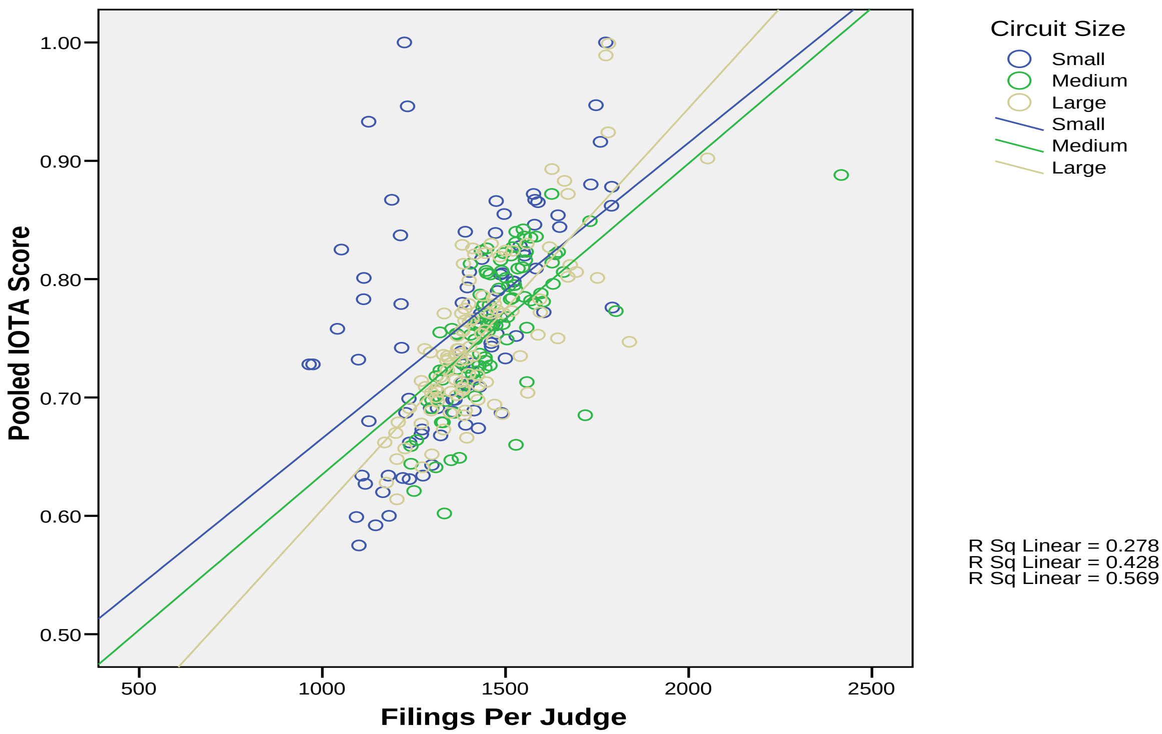

Figure 8: Homogeneity of Regression Slopes of Covariate, Filings per Judge and Circuit Size

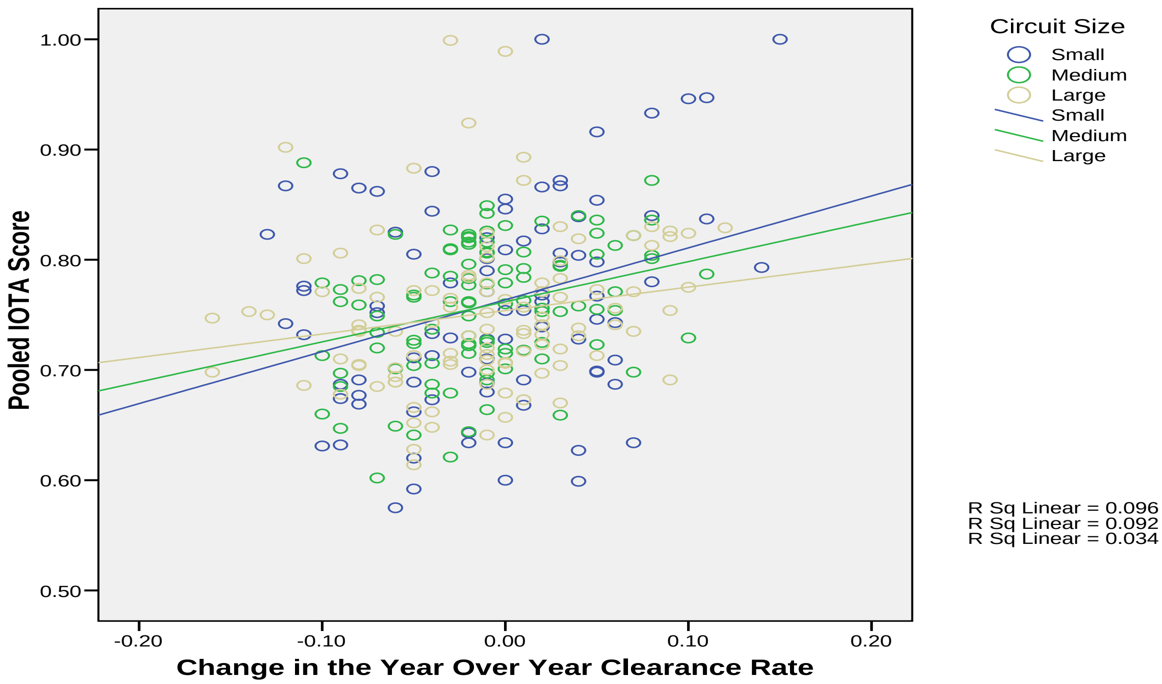

Figure 9: Homogeneity of Regression Slopes of Covariate, Clearance Rate Change and Circuit Size

Table 20: Test of Interaction Effect of Independent Variables and Covariates

Tests of Between-Subjects Effects

Dependent Variable: Pooled IOTA Score

Source	Type IV Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.978[a]	14	.070	30.738	.000
Intercept	.300	1	.300	131.964	.000
circuitsize	.060	2	.030	13.248	.000
artVperiod	.003	2	.001	.614	.542
circuitsize * filjudge	.052	2	.026	11.517	.000
circuitsize * yroveryrcr	.001	2	.001	.261	.770
artVperiod * filjudge	.006	2	.003	1.302	.274
artVperiod * yroveryrcr	.009	2	.005	1.993	.138
Error	.648	285	.002		
Total	173.170	300			
Corrected Total	1.626	299			

a. R Squared = .602 (Adjusted R Squared = .582)

Table 21: Normality Statistics for Categories of Circuit Size

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Circuit Size	Statistic	df	Sig.	Statistic	df	Sig.
Standardized Residual	Small	.091	90	.061	.947	90	.001
	Medium	.064	105	.200*	.989	105	.540
	Large	.064	105	.200*	.983	105	.196

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 22: Normality Statistics for Revision 7 Periods

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Article V Period	Statistic	df	Sig.	Statistic	df	Sig.
Standardized Residual	1993/94-1997/98	.105	100	.008	.915	100	.000
	1998/99-2003/04	.069	120	.200*	.975	120	.025
	2004/05-2007/08	.074	80	.200*	.986	80	.505

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

III. Assumptions for Regression Analysis (Productivity Analysis)

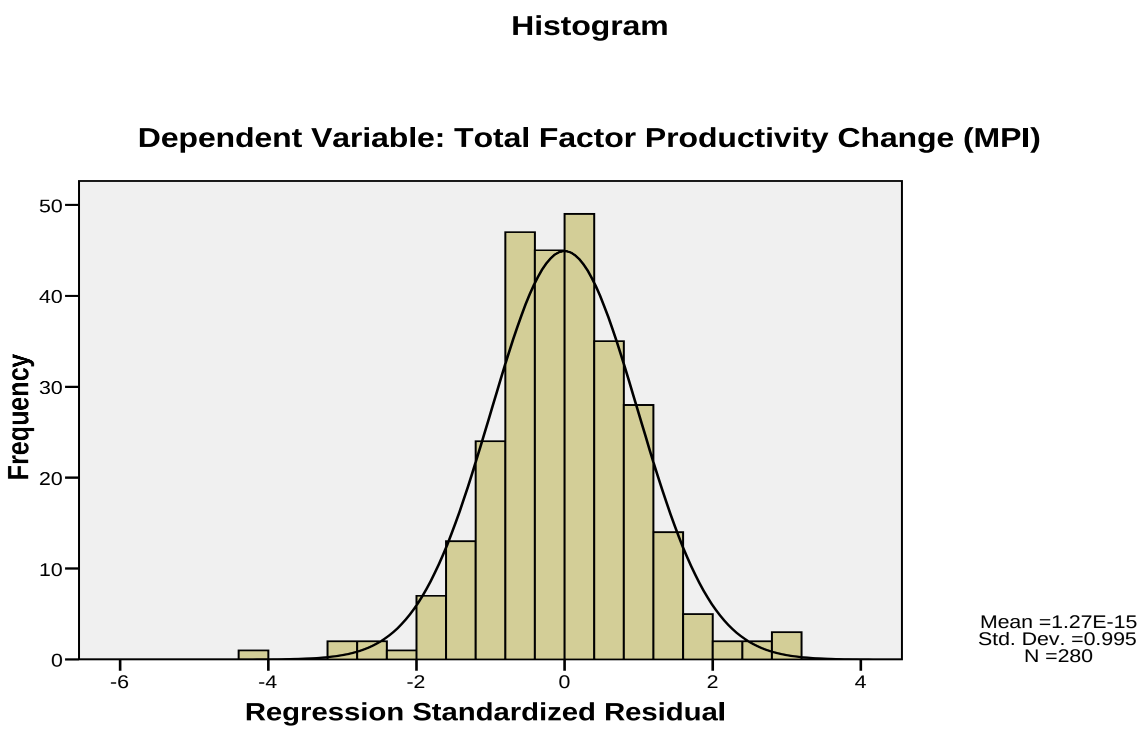

Figure 10: Histogram of TFPCH Standardized Residual

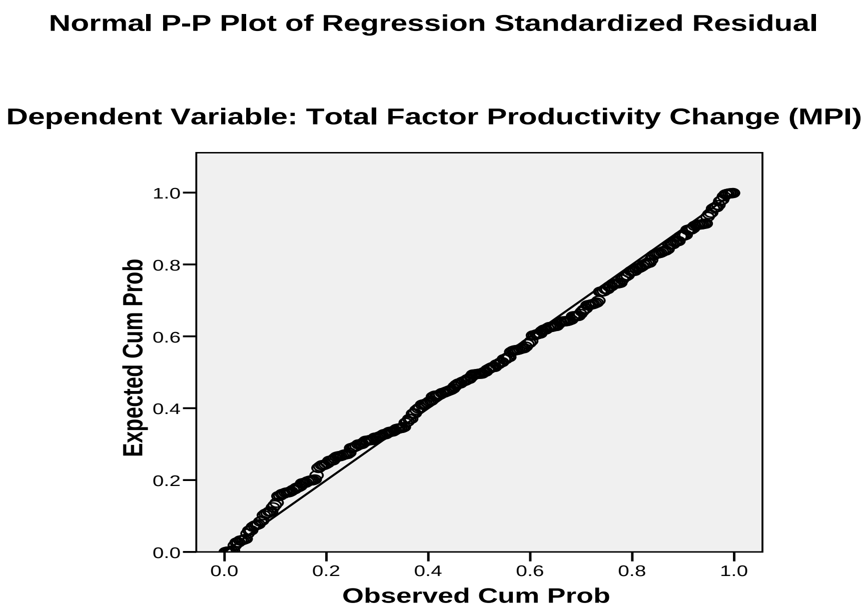

Figure 11: P-P Plot of TFPCH Standardized Residual

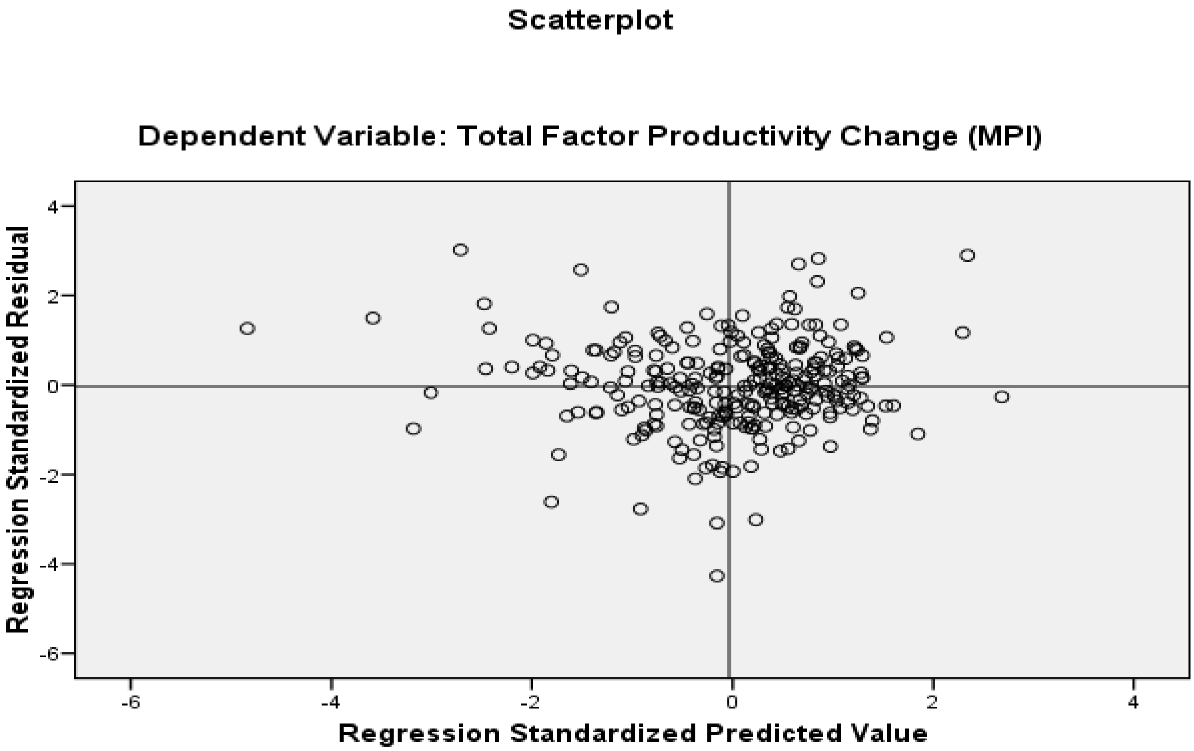

Figure 12: Scatterplot of TFPCH Standardized Residual

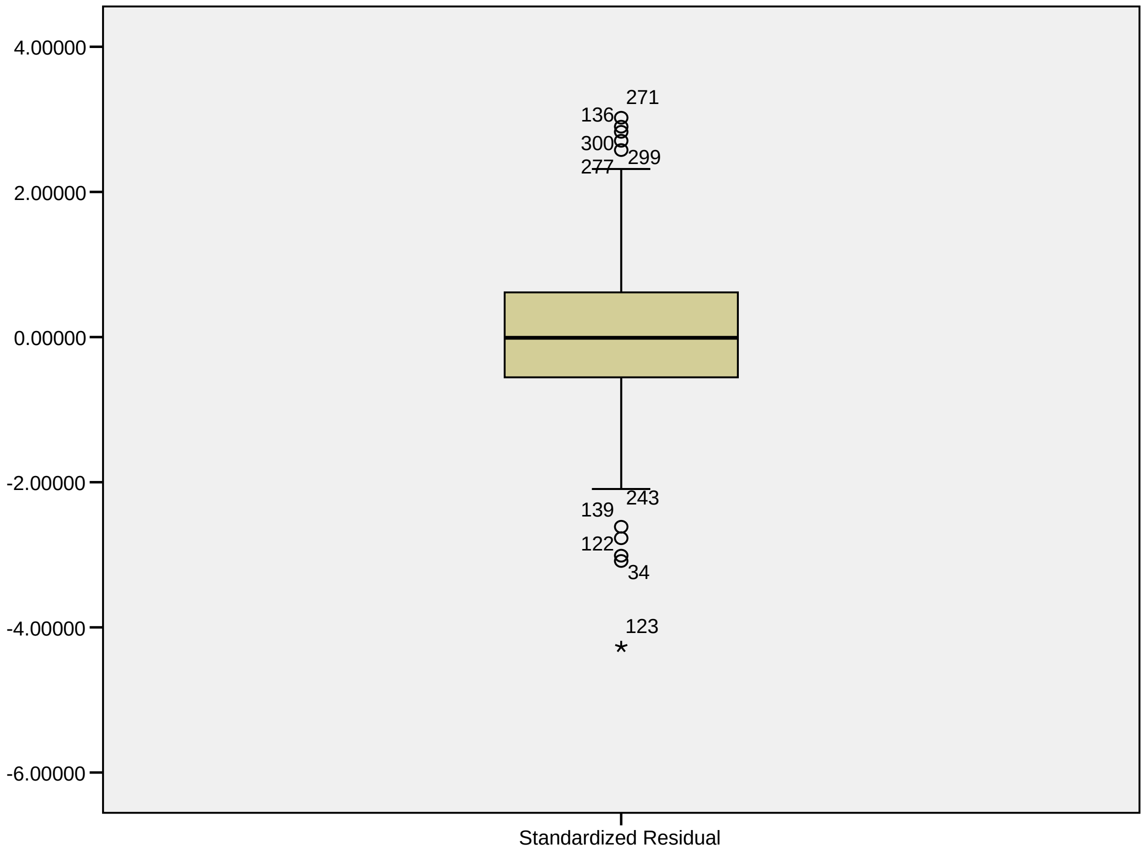

Figure 13: Boxplot of TFPCH Standardized Residual

Table 23: Normality Statistics for TFPCH and Judges Added

Tests of Normality [b]

	Judges Added	Kolmogorov-Smirnov [a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Standardized Residual	0	.067	174	.052	.977	174	.006
	1	.111	68	.037	.947	68	.006
	2	.100	23	.200*	.979	23	.885
	3	.190	11	.200*	.941	11	.535
	4	.250	3	.	.966	3	.648
	6						

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

b. Standardized Residual is constant when Judges Added = 6. It has been omitted.

IV. Assumptions for ANOVA and ANCOVA (Productivity Analysis)

Table 24: Normality Statistics of TFPCH by Category of Judgeship Added

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	judgeaddcat	Statistic	df	Sig.	Statistic	df	Sig.
Total Factor Productivity Change (MPI)	No Judges Added	.057	174	.200*	.977	174	.005
	1 Judge Added	.076	68	.200*	.980	68	.325
	2 Judges Added	.152	23	.180	.939	23	.173
	3 or More Judges Added	.158	15	.200*	.946	15	.469

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 25: Normality Statistics of TFPCH Standardized Residual by Category of Judgeship Added

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	judgeaddcat	Statistic	df	Sig.	Statistic	df	Sig.
Standardized Residual	No Judges Added	.067	174	.052	.977	174	.006
	1 Judge Added	.111	68	.037	.947	68	.006
	2 Judges Added	.100	23	.200*	.979	23	.885
	3 or More Judges Added	.140	15	.200*	.969	15	.837

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

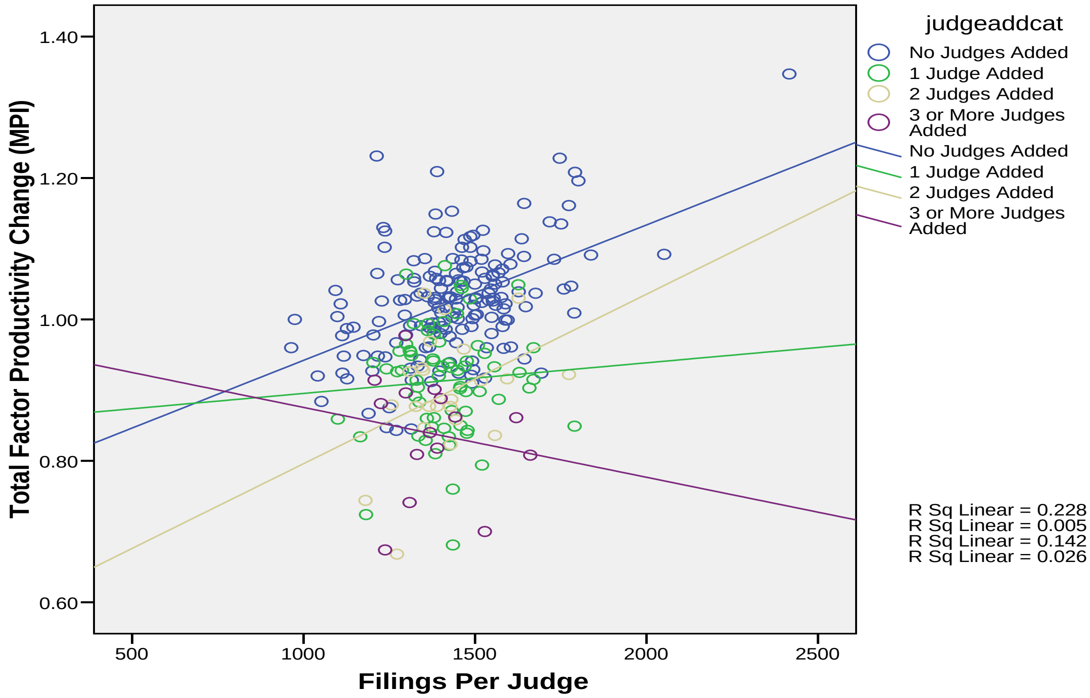

Figure 14: Scatterplot of TFPCH and Filings Per Judge to Test Homogeneity of Regression Slopes of the Covariate

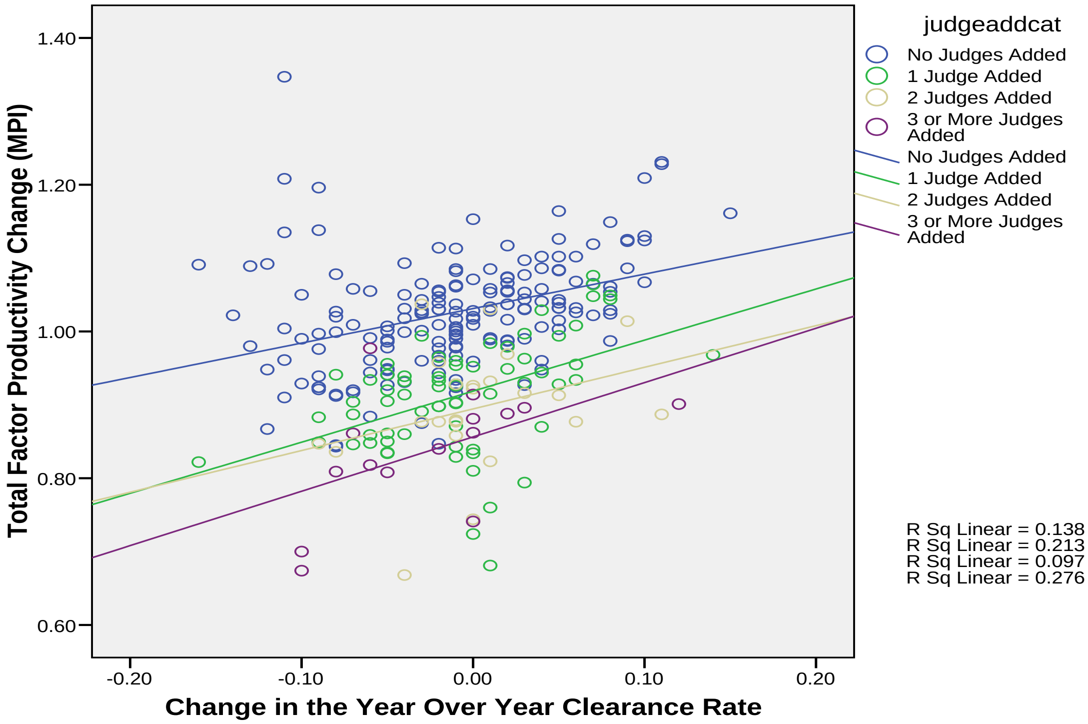

Figure 15: Scatterplot of TFPCH and Clearance Rate Change to Test Homogeneity of Regression Slopes of the Covariate

Table 26: Kruskal-Wallis Confirmatory Results

Model	Variables	Rank Score	Sig.	Results
IOTA Score and Revision 7 Period	Period 1 (N=100) Period 2 (N=120) Period 3 (N=80)	175.35 157.64 108.73	X^2 = 27.568 df = 2 p = .000	Confirms ANOVA
IOTA Score and Circuit Size	Small (N=90) Medium (N=105) Large (N=105)	153.67 157.21 141.08	X^2 = 1.987 df = 2 p = .370	Confirms ANOVA
TFPCH and Judges Added Categorical	0 Judges (N=174) 1 Judge (N=68) 2 Judges (N=23) 3+Judges (N=15)	180.76 83.76 71.59 36.40	X^2 = 117.844 df = 3 p = .000	Confirms ANOVA

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