



The Relationship between Judicial Staff and Court Performance: Evidence from Brazilian State Courts

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Abstract:

To handle the increasing caseload, the judicial systems of several countries have adopted three main strategies: changing norms and judicial procedures; investing in information and communication technologies; and hiring additional judicial staff. This paper investigates the impact of this third strategy on the performance of Brazilian courts. We use multiple regression analysis to test an array of related hypotheses about the complex interactions between the number of judicial staff and court productivity. The empirical research uses ten-year (2003-2012) data from 27 Brazilian courts. The main findings indicate that the number of judicial assistants has a positive influence on court productivity, and the number of assistants mitigates the positive relationship between court caseload and court productivity. The results are discussed and further studies are suggested.

Keywords: Judiciary; Court management; Performance; Judicial staff; Caseload

1. Introduction

The operation of courts varies greatly from one country to another, even though they have similar structures. The main reasons for this variation are associated with the institutional and political context, the substantive content of laws, the maturity of the institutions and the soundness of the state of law. Despite the differences between the legal systems of countries, some issues have priority in studies of court management, such as the population having access to the justice services, the efficiency of legal organizations and the quality of judicial service (Dakolias 1999). It is, therefore, important to understand the extent to which meeting these priorities depend on increasing the number of judicial staff

In this study we define judicial staff as the number of judges and administrative assistants working in courts. These assistants are employees who work full time directly supporting judges. Because they are hired through public competition, before taking office they go through formal legal training. Several studies have investigated the impact that hiring of new judges and assistants has on the performance of courts. Although these studies are important, they have been criticized (Jonski and Mankowski 2014). The main criticism is that the relationship between the number of staff and performance is much more complex than has been presented. In addition, the findings are unclear and controversial.

The present study aims to identify the relationship between judicial staff and court performance in the Brazilian judicial system. We use multiple regression analysis to test an array of direct and moderating hypotheses arising from the complex interactions in this relationship. The paper uses ten-year data (2003-2012) from all the 27 Brazilian state courts.

The topic is highly relevant to court administration because knowledge about the size and composition of the judicial staff in a court, and about the potential impact of changes in those components, are central to court and court system planning, budgeting, and on-going management.

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2. The Brazilian Judicial State System

The legal system adopted in Brazil is civil law, and the Brazilian legal system comprises ordinary justice and special justice. The former is divided into State and Federal courts, while the latter is divided into Labor, Electoral and Military specialties. By exclusion, the subjects that fall outside the jurisdiction of the Federal or any other specialized judicial system are the responsibility of the State System. The organizational standards of the judicial branch are defined in the Federal Constitution.

The Judicial State System has two levels. The first level is where the lawsuits begin, and the second is where appeals against decisions made at the first level are reviewed. The Judicial State System consists of 27 courts, one in each state capital city, and approximately 9,600 judicial units, deployed in 2,760 districts. The number of judicial units in a district depends on the local demand for judicial services, so in districts of larger cities there are several specialized judicial units (civil, criminal, etc.), whereas in smaller districts the judicial units are often mixed, serving various legal specialties (CNJ 2014).

The Judicial State System is the largest of the branches of the Brazilian judiciary. The judicial staff consists of approximately 11,300 judges and 180 thousand assistants, in the first and second court level, that is in trial and appeal courts. This number of judges amounts to approximately 5.6 state judges for every 100 thousand inhabitants (CNJ 2014). Taking into account the judges in all segments of the Brazilian Judiciary, the proportion increases to 8 judges for every 100 thousand inhabitants, but still remains low compared to, for example, European countries like France, Italy, Spain and Portugal, countries that have also adopted the system of civil law.

Brazilian courts have faced an imbalance between the demand for legal services and their capacity to address this demand (CNJ 2013). This imbalance has greatly increased congestion in the courts and is a sign that the courts' capacity has been exhausted and needs to be increased. The National Council of Justice (CNJ), the organ in charge of defining patterns of governance for justice, has been seeking alternative solutions to the problem, including the adoption of electronic judicial processes to increase the speed of procedures, supporting alternative mechanisms of conflict resolution, such as mediation and conciliation, and hiring more judges and employees to serve in the courts.

Over the period covered by this study, from 2003 to 2012, the number of judges and assistants in Brazilian state courts increased considerably, but the demand for justice services increased much more. The number of judges has increased approximately 20% and the number of assistants 28% over the period, while the number of pending cases increased approximately 57%. To handle the increased caseload, and prevent the system from collapsing, the pace of work of judges and assistants had to increase dramatically. Thus, the average number of completed cases per judges, that is the average productivity of the courts, increased by approximately 45% over the period. Nevertheless, this performance has failed to keep up with the increased demand during the period, which ended up causing congestion in most courts.

3. Judicial staff and court performance: research hypotheses

Assessing the judiciary's performance is not an easy task, although there are successful examples, such as the Finnish work on court performance (Savela 2006). Qualitative evaluations are very subjective because they involve judicial decisions, and the provision of a legal service involves distinct parties who usually leave the litigation process with different perceptions (Gomes and Guimaraes 2013). An easier task is evaluation based on quantitative indicators. But this procedure has been the subject of much criticism, since quantitative evaluations are generally restricted to analyses of the productivity and efficiency of the courts. However, some studies (Djankov et al. 2001; Buscaglia 2001) indicate a positive correlation between efficiency and quality in many courts. According to Abramo (2010, p.325) "the fact that quantitative measures are not sufficient to assess the judiciary cannot be used as an excuse not to measure what can be measured".

In order to explain what influences judicial performance, several dimensions have been investigated, including the number of judicial staff available in the courts. The results of previous studies regarding the impact of judicial staff on court performance are unclear and apparently contradictory. Some studies (Hazra and Micevska 2004; Mitsopoulos and Pelagidis 2007; Rosales-López 2008; Elbialy 2011; Backes-Gellner et al. 2011) suggest that the number of judges and assistants positively influence court production, which means that the more judicial staff available, the more the quantitative production of the court.

On the other hand, some studies indicate that the number of judges negatively influences court productivity (Beenstock and Haitovsky 2004; Dimitrova-Grajzl et al. 2010; Castro 2011). That is, under certain conditions, increasing the number of judges in a court may reduce each judge's individual productivity, and consequently reduce the court productivity. This is because the pressure on judges decreases when new judges are hired (Castro 2011). In the present work we departed from this argument using the concept of productivity. Our first hypothesis is as follows:

Hypothesis 1: *The number of judges has a direct and negative effect on court productivity.*

The number of judicial assistants has been stated to be an important dimension of court performance in several studies (Chaparro and Jiménez 1996; Mitsopoulos and Pelagidis 2007; 2010). The argument is that the assistants directly influence judges' working conditions, which may be reflected in the court's productivity. In short, a larger support team creates a better working environment for judges, which tends to increase the speed and the productivity of the court outputs. Thus, our second hypotheses suggest that the number of assistants exerts a direct and positive influence on court productivity.

Hypothesis 2: *The number of judicial assistants has a direct and positive effect on court productivity.*

Court caseload has been a central issue discussed in the literature about court management (Daniels 1984). The court caseload indicates the level of work that must be carried out by judges and assistants, and also indicates the level of pressure exerted on judges from various sources, such as lawyers, higher courts, controlling bodies and so on. Several studies (Luskin and Luskin 1986; Beenstock and Haitovsky 2004; Dimitrova-Grajzl et al. 2010; Castro 2010) suggest that caseload has a positive influence on court performance. The explanation offered is based on the argument for judges exogenous productivity, which suggests that the judicial system has self-regulating mechanisms of production, so that when the caseload increases, the pace of work in the court also increases, thus avoiding an explosive growth of the caseload.

According to the exogenous productivity argument, the number of judges required in a court varies inversely with caseload pressure, which means that with minimal case processing pressure, judges will expand the time required to finish cases (Jonski and Mankowski 2014). Thus a *ceteris paribus* increase in the number of judges will tend to reduce the productivity of incumbent judges, because caseload pressure is reduced (Beenstock and Haitovsky 2004). On the other hand, it could be argued that the newly appointed judges naturally increase the court output. However, this increase may be partially or even totally offset by the reduced productivity of former judges (Jonski and Mankowski 2014).

The exogenous productivity argument has been the target of much criticism. According to Jonski and Mankowski (2014), the "so called 'exogenous productivity of judges' hypothesis might be attributed to a modeling flaw... originating in neglecting time constraints faced by judges or in ad hoc application of specific functional form, without in-depth consideration of their plausibility" (p.70). Those authors also suggest that, "Contrary to the views promulgated by the prophets of the 'exogenous productivity', judges operate in the universe where adjudication takes time and a day lasts no more than 24 hours" (p.70) and explain that judicial productivity is objectively constrained, and, "when these constraints are met, additional staffing or procedural streamlining is necessary to avoid backlog explosion" (p.70).

The caseload consideration is important in the context of this study because it sets the volume of work that must be performed in courts, which directly involves the judicial staff. In the next two hypotheses we anticipate that the number of judicial staff acts as a moderating variable in the relationship between court caseload and court productivity. In other words, it is expected that the court caseload-productivity relationship is mitigated or enhanced by the number of judges and assistants working in courts. The next two hypotheses are as follows:

Hypothesis 3: *The number of judges moderates the relationship between court caseload and court productivity.*

Hypothesis 4: *The number of judicial assistants moderates the relationship between court caseload and court productivity.*

4. Method

This paper uses data from all 27 Brazilian state courts. Data were collected from the reports Justice in Numbers covering a ten-year period, from 2003 to 2012. Justice in Numbers is a public database developed since 2003 by the CNJ, and supplied with information from all Brazilian courts. Despite the importance of the Justice in Numbers database, data released by this report are aggregated, which unfortunately makes it impossible to make more in-depth analyses related to the context of the Brazilian judicial system.

The dependent variable represents court productivity and was measured by the number of settled cases per judge per year. This variable is the sum of all cases completed in the year divided by the number of first instance judges. While this measure is certainly common in the literature, it ignores potentially critical variation in case complexity that certainly is of considerable importance across case types. That is, case X may be fundamentally more complex than case Y and such

differences may directly affect how long judges take to conclude different cases. However, we use aggregate data at the level of the courts, and so we assume that state courts have different types of judicial cases in terms of complexity, but on average the level of complexity is quite similar.

We assume that measures of court performance used in this study are appropriate for gauging the effect of judicial staff size on court performance. The average number of cases resolved is not an ideal indicator of court performance, and that there is many other possible measures that would probably be more appropriate. There are many dimensions of court performance beyond that which is the focus of this article. But unfortunately our choices are limited by the data available in the Brazilian judicial system.

As seen in Table 1, the average court productivity is 1,006 resolved cases per judge per year, and the standard deviation indicates a considerable variation among Brazilian state courts. Similarly, it is possible to observe a wide variation in courts regarding the others variables presented.

Table 1: Descriptive statistics of the variables

Variable	Mean	Std. dev.	Min.	Max.
Case productivity (case resolved per judge/year)	1006	758	202	3454
Court caseload (per judge)	3770	2712	1113	12027
Judges (per 100.000 inhabitants)	5.0	1.6	1.8	9.0
Assistants (per judge)	18.8	8.7	5.0	38.1

N: 270

Source: Justice in Numbers 2003-2012 (CNJ)

The explanatory variable is the judicial staff, represented by (a) the number of judges, measured as the proportion of judges per 100 thousand inhabitants; and (b) the number of assistants divided by the number of judges. The weighting of this second variable by the number of judges is necessary due to the discrepancy existing between Brazilian state courts. There is an average ratio of five judges for every 100 thousand inhabitants, and almost 19 assistants for each judge.

The assistants are a group of full-time employees who assist the work performed by judges. These assistants help judges in judicial and administrative activities. The judicial activities are related to caseload management, and administrative activities with specific non-judicial management functions, such as organizing and scheduling dockets, managing a case docketing system, communicating with the parties as to the status of cases and ensuring that delay is minimized. Only permanent employees were considered in the analysis. Permanent employees are those approved by public competition, and therefore qualified to work in courts. Other types of assistants who perform secondary tasks, such as security and cleaning, were not included in the analysis.

The caseload was measured by the total collection of pending cases in the first instance. The caseload is the sum of the old cases, already present in court, and new cases filed in court during the reference year, minus the total number of cases resolved during the year. Table 1 shows an average of 3,770 pending cases per judge. The data also show a huge variation between courts regarding the total caseload. Some courts averaged little more than one thousand pending cases per judge, while others averaged more than ten thousand cases.

In order to identify the direct effects of judges and assistants (explanatory variables) on court performance (dependent variable) we estimated a time-series regression model with 270 observations (27 courts over a 10-year period). This type of analysis is suitable for the type of data we have available, panel data. As the sample of state courts in Brazil is relatively small, only 27 state courts, the method used was to consider that each court in a given year is a different observation, so that the sample size affords the necessary statistical conditions to analyze the direct and indirect relationships between the independent and dependent variables.

For the sample we used multiple regression analysis and the panel-corrected standard error model (PCSE). Based on these statistical techniques we estimated a pooled and a fixed effects model. In a pooled model, all observations are arranged in a set of data that does not take into account specific features of each observation. In contrast with this, a fixed effects model assumes that each individual court/year has a different intercept in the regression equation. The main

advantage of fixed effects models is that the heterogeneity between courts is taken into account, which helps to mitigate autocorrelation problems. Fixed effects models were constructed with dummy variables for each court.

We use this approach because it helps to explain direct and indirect relationships between the variables of interest. Previous studies based on the Justice in Numbers database, many the CNJ itself, have been restricted to conducting exploratory and descriptive analyses of the courts' performance. The most frequently used analysis technique is data envelopment analysis (DEA), a mathematical technique used to compare courts for the purpose of benchmarking (Gomes and Guimaraes, 2013). This type of analysis has its value, but the complexity of the judicial system requires further analysis, to seek, for example, to explain why some courts are more productive than others. Thus, we believe that the approach we use in this paper is very useful and should be of use to court managers and policymakers concerned about court operations.

5. Results and Discussion

The preliminary statistical analysis (Pearson correlation linear test) indicated no correlation between the explanatory variables associated with judicial staff: the proportion of judges and the number of assistants. The results indicated a weak and positive correlation (.129, $p < .01$) between the number of assistants and caseload. This initial result suggests that, unlike what is observed in assistant allocations, the allocation of judges into judicial units does not take into account the court caseload. In other words, the number of judges does not depend on court caseload.

Table 2 shows the results of regression analysis with panel data, using as dependent variable court productivity. In both models estimated, pooled and fixed effect, the caseload is positively related to productivity. This relationship was expected in view of similar results in previous studies (Beenstock and Haitovsky 2004; Dimitrova-Grajzl et al. 2010; Castro 2011). In Brazil, one of the explanations for this result lies on the adoption of mechanisms for controlling judicial performance. The main example is the establishment of the National Justice Council (CNJ) in 2005. Since then the courts, pushed by CNJ's guidelines, have defined target plans to reduce the backlog of pending cases. These plans have their main impact on overcrowded courts.

Table 2: Results of panel data regression for court productivity

Dependent variable: Court productivity	Regression models	
	Pooled	Fixed ^a
Court caseload	141.94 (12.98)**	49.75 (16.66)**
Explanatory variable:		
Number of judges	19.20 (9.02)*	12.71 (12.93)
Number of assistants	26.85 (3.18)**	8.70 (3.16)**
Adjusted R-squared	0.43	0.69

^a Cross-section fixed effect with dummy variables

Total panel (balanced) observations: 270

Unstandardized coefficient; Standard errors in parenthesis

* $p < 0.05$; ** $p < 0.01$

The fixed effects model results indicate that an increase of one thousand pending cases per judge will increase court productivity by approximately 5% on average. However, the linear relationship between these variables certainly has limits, so that the increased demand will cease to have an effect on productivity when the court or judicial unit reaches a specific caseload. In the pooled model the number of judges had a negative and statistically significant relationship on court productivity, but in the fixed effects model the results do not indicate statistical significance between those variables. This may suggest the presence of autocorrelation in the explanatory variables used in the first model, mainly because heterogeneity among courts has not been taken into account. Thus, based on fixed effect model, Hypothesis 1 was rejected.

The rejection of the Hypothesis 1 indicates that the proportion of judges has no influence on the average productivity of the courts. That is, the average productivity increased in the period analyzed independent of hiring new judges. However, it is not possible to say that the increase in the number of judges has no influence on the pace of work in the courts, because this study examined only one of several possible indicators of judicial production. This result is important in

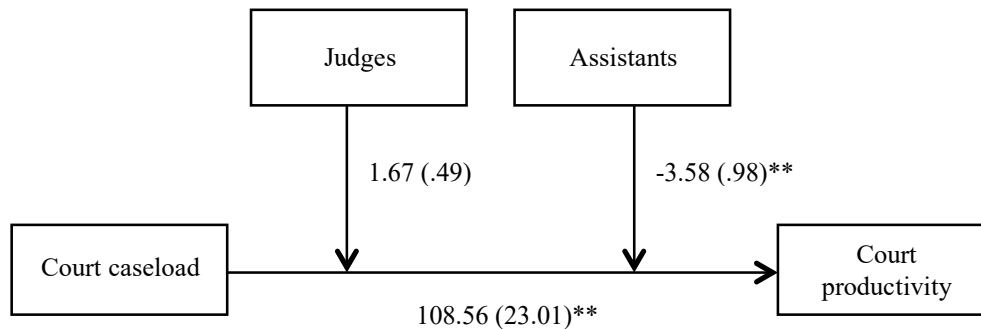
theoretical terms since it does not support the so-called hypothesis of exogenous productivity of judges, supported by several previous studies (Beenstock and Haitovsky 2004; Dimitrova-Grajzl et al 2010; Castro 2011).

The results confirm Hypothesis 2 and show a positive and statistically significant relationship between the number of assistants and court productivity. Those results are partly convergent with Chaparro Jimenez (1996) and Lopez-Rosales (2008), suggesting that courts with a larger number of assistants are more productive. The results also show that the addition of an assistant for each judge increases court productivity by approximately 1% on average. This is a small effect considering that each judge has, on average, 19 assistants. For example, if the number of assistants increased by 50%, which certainly is a very high financial investment, an increase in court productivity would be approximately 10%. It is important to take into account whether the use of limited resources to hire assistants in order to increase court productivity is an appropriate strategy.

The assistants' contribution to court productivity is limited and secondary, since mainly the judges carry out court production. Still, the tasks performed by assistants are crucial to the operating procedures of courts and judicial units. When assistants are able to solve administrative problems effectively, such as giving information to users and organizing and filing cases, judges will have more time available to devote to judicial activities. In the absence of these professionals, the judges would probably carry out many administrative tasks. Thus, the existence of a sufficient team of assistants allows judges to devote more time to judicial activities, which tends to increase the court's productivity. This result is important in practical terms to signal to the judicial managers that the work of judges is being underused in administrative activities, and assistants could carry out these activities.

The relationship between caseload and court productivity is positive, a result that was expected in view of the results of several previous studies on the subject. Overall, this indicates that the increase in caseload generates an increase in effort on the part of judges and assistants to decrease caseload. The results of Hypotheses 3 and 4 indicate the circumstances in which these efforts are amplified or mitigated. The models representing these hypotheses are shown in Figure 2.

Figure 2: Regression results for judges and assistants as moderator variable



Unstandardized coefficient; standard errors in parenthesis.
 * $p < .05$; ** $p < .01$

The first part of the model shows that the proportion of judges does not moderate the relationship between caseload and productivity. The rejection of Hypothesis 3 indicates that the proportion of judges in the courts has no influence on the phenomenon, and neither extends nor mitigates verified efforts. Moreover, the confirmation of Hypothesis 4 shows that the number of assistants moderates the relationship between caseload and productivity, so that the greater the number of assistants, the lower the strength of the relationship. The second part of the model shows that the number of assistants moderates the relationship between caseload and court productivity. This means that the number of assistants, while maintaining a direct relationship with the court's productivity, is also indirectly related to this variable. This result confirms Hypothesis 4 and can be interpreted as follows: the positive relationship between caseload and court productivity is mitigated when the number of assistants is increased.

Figure 3 shows a comparison between the hypotheses formulated and the results provided by the research data analysis. Two of the four proposed hypotheses were confirmed: H2 and H4; while Hypotheses H1 and H3 were rejected.

Figure 3: Hypotheses summary and results of the study

Hypotheses		Results
H1	The number of judges has a direct and negative effect on court productivity	Rejected
H2	The number of assistants has a direct and positive effect on the court productivity	Confirmed
H3	The number of judges moderates the relationship between caseload and court productivity	Rejected
H4	The number of assistants moderates the relationship between court caseload and court productivity	Confirmed

6. Final Considerations

This study aimed to identify the relationship between judicial staff and court performance. The main results were as follows: (a) the proportion of judges does not influence court productivity; (d) the number of assistants has a positive influence on court productivity; and (c) the positive relationship between court caseload and court productivity is mitigated by the number of assistants.

The findings advance knowledge by showing that the effect of demand for judicial services, and consequently the effect of caseload on court productivity, depends directly on the judicial staff available in courts. Thus, there is an evident need to manage the judicial staff available in the courts carefully, especially the assistants. As the results show, this is a strategic task that can directly affect a court's performance.

The present study has some limitations, the main one being the lack of data regarding the Brazilian Judiciary. In Brazil the systematic collection of data by the judiciary started only in the 2000s, especially after the creation of the CNJ in 2005. The data are, as yet, very limited, which restricts the possibility of deeper analysis (Gomes and Guimaraes 2013). In this research the limited data hinders, for example, the investigation of whether different types of judicial staff influence the judges' work and court performance, or even whether other variables and indicators of judicial performance should be used. (For methodological issues on caseload management of courts, see Lienhard and Kettiger 2011.) The use of disaggregated data would make it possible, for example, to investigate discrepancies in caseload size and case composition, and pay attention to different types of duties performed by various categories of administrative assistants.

Data limitations prevent important issues from being investigated, thus leaving unanswered questions. We believe that some of these answers can be obtained through interviews with senior court administrators and judges who are familiar with the jurisdiction, and that they could provide some guidance on how further investigations could be conducted to yield an outcome that would be relevant and useful for court management. The present study is a macro-level analysis of a bank of court data, a useful starting point for a broader study that could yield a lot of useful information for the court system. Future studies could conduct visits to a sample of courts at the first-instance and intermediate appellate levels and engage judges and chief clerks in interviews designed to test the practical validity of the statistical conclusions.

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