Information Frictions and Court Performance: Experimental Evidence from Chile[1]

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Abstract

This study examines information frictions in Chilean court management and their impact on judicial productivity. We implemented an email campaign to boost court managers' usage of an online platform displaying court statistics. Employing a randomized design, a subset of managers received access to a simplified homepage with these statistics. Our analysis reveals that this simplification markedly improved court productivity. Specifically, courts with access to the simplified information experienced a significant increase in case clearance rates, measured by a standard deviation. These findings underscore the efficacy of targeted information interventions in enhancing legal institutional efficiency.

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1 Introduction

Despite the growing abundance of administrative data in public institutions, effectively harnessing this data for evidence-based decision-making remains a significant challenge. Recent literature underscores a notable gap in data-management and analytical skills within the public sector, inhibiting the full utilization of available data (OECD, 2014; Savoldelli et al., 2014). This presents an urgent need for strategies that can alleviate these constraints, enabling institutions to capitalize more effectively on their data resources.

In this context, the implementation of performance measures in public administration offers a promising avenue. These measures, designed to assess and enhance the efficiency, effectiveness, and overall productivity of public services, have been increasingly recognized for their potential to inform and refine management and policy decisions (Ostrom and Hanson, 2010; Hanson and Ostrom, 2014; Durham and Becker, 2016). However, the adoption of such measures remains limited, often constrained by managerial attention capacity (Gabaix, 2014) and analytical capabilities (Kleiman, 2009). Our study addresses this gap by exploring how simplifying the presentation of performance data in the judiciary can reduce informational frictions, thereby enhancing the use and impact of this data in judicial decision-making processes.

This paper analyzes information frictions in the context of Chilean courts. It establishes, first, that there are in fact substantial and consequential information frictions among court managers regarding their courts. Specifically, we show that, despite data availability, many managers have inaccurate beliefs about their own court's performance. Second, we use a randomized experiment to show that a simple informational intervention can significantly improve court performance: providing information to court managers in a clear and digestible way causes them to adjust their decisions and improve court efficiency. Finally, we show that more experienced and older court managers hold less accurate baseline beliefs about their court performance and are less likely to access court information online. We find no evidence that more experienced court managers benefit less from the intervention; thus, the intervention we analyze is likely to help all court managers of different ages and years of experience without increasing gaps in performance.

To achieve these goals, we partner with the Department of Institutional Development of the Chilean Judiciary to conduct a randomized control trial in Chilean family courts. Through a factorial design, we analyze two main interventions: an email promotion of the online court management platform, and a redesign of that platform. We evaluate whether each of these interventions—or the combination of both—increases

the usage and digestion of information on the online platform and enhances court productivity.

Chilean family courts are an ideal setting for our analysis. They handle cases pertaining to child custody and alimony, gender-based violence, and divorce, among others. Delays in the resolution of these matters often have serious implications for vulnerable individuals, such as children and at-risk women. For example, Cooper et al. (2023) provides evidence that, in Chile, prolonged legal proceedings in foster care cases raise youth crime involvement and deteriorate school attendance. In an effort to improve court efficiency, in the early 2000s, the Chilean Judiciary created a new administrative position in family courts, the court manager. Court managers are responsible for planning, organizing, and monitoring the day-to-day operations of the courts, and supervise between 40 and 60 court staff each. Based on a survey that we conducted in 2020, 70% of the court managers in the country agree or strongly agree that tracking court indicators is one of the most important tasks of their job (see Section 3.2 for methodology and results of the survey). Yet, our evidence suggests that managers are not well acquainted with their own court measurements. When managers were asked to recall their court's case clearance rate, which is commonly considered the main indicator of court speed, in the preceding two months, 40% of the managers were off by more than 25% from the true value. This lack of familiarity with court statistics exists despite the availability of accurate data. Since 2018, court managers have had access to court measurements through an online platform, named Quantum. But, while 71% of court managers agree or strongly agree that the information in Quantum is useful for their work, the usage of the platform is limited: From from July 2018 to August 2019, the median number of logins per manager was only 6, with over 35% of the court managers never logging in.

In our first intervention, we randomly promote Quantum by sending court managers promotional emails; we refer to this as the *email promotion* intervention. In the second intervention, which we call the *feedback intervention*, we redesign Quantum and randomly assign court managers to different versions of the platform. In one arm of the feedback intervention, we provide court managers with a new dashboard on the homepage of Quantum that simplifies and summarizes the main performance statistics (*simplified feedback*). In another arm, we supplement the simplified dashboard with a pop-up window that compares the managers' best and worst statistics relative to another family court of similar size (*social comparison feedback*). The social comparison mobilizes mechanisms that draw on social norms, comparisons, and pro-social behavior effects. Finally, the court managers in the control group of the feedback intervention continue seeing the original version of Quantum, which presents statistics

in a disaggregated table.

How managers respond to the three treatments we consider—i.e., email promotion, simplified feedback, and comparison feedback—is a non-trivial empirical question. Although the interventions facilitate access to performance measures and reduce information frictions, it is possible that managers perceive them as an accountability mechanism that enables their superiors to control their efforts and compare them to other court managers. This, in turn, could deteriorate the managers' sense of autonomy and reduce their effort (Humphrey et al., 2007; Rasul and Rogger, 2018). Similarly, the dashboards in the feedback intervention—notably those in the social comparison treatment—can be interpreted as providing unsolicited feedback to the court managers. According to West et al. (2018), this type of feedback may increase physiological and psychological expressions of anxiety, which, in our setting, could lead to worse court performance.

All interventions began in February 2021 and lasted until June 2021. We find that the feedback interventions have a substantive effect on important court performance measures. Using newly-collected case-level data from family courts, we find that both the simplified and the social comparison feedback treatments lead to a decrease in case duration: specifically, the case-closure hazard rate in courts exposed to the treatments increases by over five percent. Turning our attention to official indicators at the court-month level—the same measures fed to the Quantum platform—we find that the simplified feedback treatment significantly increases the case clearance rate of affected courts by about one standard deviation. The point estimate for the impact of the social comparison feedback on case clearance is similar—although the effect is not significant at conventional levels. Both feedback interventions have positive, significant effects on the rates at which the courts resolve motions and schedule hearings. Importantly, the treatments do not seem to systematically alter the method of resolution of the cases; for example, we do not observe a higher incidence of case dismissals in treated courts. Thus, our findings suggest that the feedback treatments increase the efficiency of the courts at no expense of case-decision quality. Interestingly, the effects of the simplified and social comparison feedback treatments are very similar to each other. Thus, relative to the simplified feedback, we find no *additional* effect—positive or negative—of the social comparisons on the behavior of managers.

As for our other intervention, the email promotion treatment, we find that it has a much smaller impact on case outcomes, with no significant effects on case duration or the case clearance rate. These null results are in place even though managers exposed to the email promotion treatment seemed to have increased their login frequency on Quantum. That is, having the managers access court measurements more often with-

out providing them the simplified information available in the feedback controls is not enough to considerably affect court performance. Thus, among the treatments that we consider, only those that make information easier to grasp help improve court efficiency.

Are all managers likely to equally benefit from our interventions? Given that the technology to easily access court performance measures is relatively new for the Chilean court managers, court managers with different years of experience and age are not equally proficient in the use of the platform. Prior to our intervention, managers who were more experienced and older logged in fewer times into the Quantum platform and held less accurate baseline beliefs about the court performance. Interestingly, we find no evidence that the treatment effects benefit more those who are less experienced and thus more tech-savvy. As the treatments improve the productivity of most indicators, the interventions are helping reduce information friction without increasing gaps in technology usage between court managers at different stages of their careers.

This paper extends the burgeoning literature on mitigating information frictions in public sector management, a field gaining momentum following substantial governmental investments in high-frequency data collection. A key focus is the deployment of informational dashboards, a tool scrutinized across various domains such as social protection programs (Dodge et al., 2021), healthcare (Callen et al., 2020; Whidden et al., 2018), civil service (Mattsson, 2021), education (Dizon-Ross, 2019), and taxation (Pomeranz, 2015). Uniquely, our study explores the impact of such dashboards within the judicial system—a sector traditionally resistant to reform and empirical evaluation (Engel, 2013; Greiner and Matthews, 2016). In contrast to the internal focus of dashboards, other innovative judicial interventions have targeted broader public engagement. Notably, studies conducted in Mexico (Sadka et al., 2023) and Kenya (Chemin et al., 2023) represent a significant shift towards engaging the general public in public sector reforms. These initiatives, markedly different from the internal dashboard mechanisms, demonstrate the potential for public-oriented strategies to contribute to public sector efficiency. Thus, our research complements these existing judicial studies and adds a new dimension to the ongoing discourse on leveraging information to enhance court productivity, by focusing on internal tools like dashboards rather than public-facing interventions.

Beyond this, our study contributes to the broader analysis of how internal government processes affect public service quality. We examine the influence of low-cost, technologically modest interventions on court administration and justice delivery. Our work parallels recent studies on governance improvements through technological means, such as employee monitoring with time clocks (Banerjee et al., 2008; Dhaliwal

and Hanna, 2017), phone call surveillance (Muralidharan et al., 2021), and bespoke mobile apps (Callen et al., 2020; Dodge et al., 2021). Contrary to these approaches, which often introduce new technologies, our study capitalizes on existing technological infrastructures. This strategy offers distinct advantages: minimal fixed and ongoing costs, scalability across diverse settings, and the ability to swiftly adapt to evolving challenges. Importantly, it bypasses the steep learning curve associated with new technology, particularly impacting veteran employees.

2 Court Managers and Quantum Platform

The court managers' primary role is to facilitate the administrative functioning of the court. The position arose in the early 2000s from the need to separate the jurisdictional responsibilities of judges from the administrative management of the court system. Each manager oversees one court and supervises 40 to 60 employees. They are responsible for planning, organizing, directing, and monitoring the work of the court, as well as for optimizing the performance of the court staff (Chilean Judiciary, 2020). For example, court managers have the discretion to alter the court's agenda and hearing schedule, as well as to redistribute tasks among the staff in response to inflows in the number of incoming cases (see Table 11). The position of managers is quite stable; in fact, many of the individuals in our sample have been court managers since the inception of the position more than sixteen years ago. See Section 3 for more information on the characteristics of the court managers in our study.

In July 2018, the Department of Institutional Development of the Chilean Judiciary created the online Quantum platform. Quantum provides court managers and other court staff with access to comprehensive information on performance metrics at the court level, such as the number of cases filed, the case clearance rate, the average duration of cases, and the percentage of realized hearings. Quantum presents the information for all courts, thus allowing users to compare the performance of different courts. The indicators are aggregated at monthly and yearly levels.

Since Quantum's launch in 2018, take-up has been limited. In the period from July 2018 to August 2019, the median number of logins per manager was only 6. More strikingly, over 35 percent of the managers never logged in throughout this entire period. The platform is technologically well-developed and rich in information; yet it is unclear whether it has any impact on the management of the court.

In a baseline survey that we conducted with managers in early 2020 (see Section 3.2 for details), over 90 percent of the respondents were aware of Quantum's existence.

But one third of the respondents claimed that Quantum misses relevant information or features—even though, as explained above, the platform makes available a vast amount of data. This pattern in the survey responses suggests that one of the culprits for low Quantum utilization could be the platform's design.

Specifically, one potential issue with the platform design is that part of Quantum's target audience—especially those without a quantitative background—may view the information provided by the platform as overwhelming and not sufficiently clear. Upon login, users are taken to an initial homepage that provides a packed table. It might not be immediately clear to a user how to access disaggregated data or to look for information of a specific kind. In other words, it is easy for users to get lost in the platform. In the next section, we describe how our intervention attempts to make the information on Quantum easier to digest.

3 Intervention and Data

Our intervention focuses on 49 family courts in Chile—each of them supervised by one court manager.[2] As of 2019, these courts employed 1,697 court staff in the aggregate, including 254 technical advisers, 1,106 administrative officers, 85 heads of unit, and 252 judges. These 49 family courts saw 270,952 new cases opened in 2021. The most common case types in that year were contested proceedings (26.6%), domestic violence (20.8%), protection measures (18.5%), complaining procedures (16.0%), and mediation (12.6%).

We randomize the 49 family courts into one of six treatment arms: (C) control; (T1) email; (T2) simplified feedback; (T3) email and simplified feedback; (T4) social comparison feedback; and (T5) email and social comparison feedback. We stratify on the number of incoming cases in 2019—a proxy for the size of the court. The randomization selected eight courts in control, eight in Treatment 1, nine in Treatment 2, eight in Treatment 3, nine in Treatment 4, and eight in Treatment 5. The factorial design implies that the same courts are randomized into the email/no email treatments and the feedback/no feedback treatments. Thus, regarding the email intervention, we have 24 courts in the email promotion treatment arm and 25 in the treatment arm with no email promotion. Similarly, for the feedback intervention, we have 16 courts in the

[2] As outlined in the pre-analysis plan of the paper, the initial intervention was intended to encompass all three hundred and forty-six Chilean courts supervised by court managers. However, due to institutional constraints, the implementation of the intervention was confined solely to family courts. In total, there are 60 family courts in Chile. However, in 2020, 10 family courts were chosen by the Department of Institutional Development of the Chilean Judiciary to design the simplified homepage of the Quantum platform, and were therefore excluded from the experiment. We also excluded another court from the analysis because we received no performance metrics on it.

treatment arm with no feedback and 33 in the treatment arm with either simplified feedback or social comparison feedback.

The intervention was launched on January 26, 2021, and lasted 5 months, until the end of June. Given the number of courts and the time frame of our study, we are able to detect "medium" size effects, between 0.4 and 0.6 standard deviations (see Appendix A.4). Managers from all 49 courts, including those in the control group, received an initial email on January 26 of 2021. This initial email informed the managers about Quantum, how to access it, and how to retrieve their password, if forgotten. Managers from courts in Treatments 2, 3, 4, and 5 (feedback treatment arm) were also informed about changes in their homepages. Managers from courts in the control group (C) had no change to their Quantum homepage nor were provided with any Quantum promotion after the initial January 26 email.

Managers from the courts randomized into Treatments 1, 3, and 5 (email promotion treatment arm) received three different emails in three different months promoting access to Quantum.[3] The emails began by announcing and congratulating the top two or three managers who logged into Quantum the greatest number of times in the previous month. Furthermore, the emails were personalized using the information on recent login activity by the recipient manager. If the manager did not login at all in the previous month, the email would contain the following text: "We noticed you did not access Quantum during [month] of 2021. You are losing the opportunity to follow your indicators and evaluate the productivity of your court and compare it to other courts". For those that had at least one login in the previous month, the email read: "We trust you will all continue using Quantum to follow your indicators, evaluate the productivity of your courts and compare it with other courts." Additionally, all emails included a small paragraph stating that most users judge Quantum positively for its easy usage, clear information, trusted indicators, and relevance to one's work. The paragraph also mentioned that those using Quantum have a larger clearance rate for cases older than two years. Finally, all the emails included a Quantum link and a large linked button to Quantum to increase the accessibility and salience of the platform. The distinct email versions sent are presented in Appendix A.3.

The courts randomized into Treatments 2, 3, 4, and 5 (feedback treatment arm) had their homepage in Quantum updated to a simplified version. This homepage presents the key statistics at the court level. Examples of the old and new homepage versions are shown in Figure 1 and Figure 2 in Appendix A.2. The old version includes a condensed main table showcasing the number of incoming cases, terminated cases, hearings, protection measures in favor of children, legal writings, resolutions,

[3]The three rounds of emails were on February 22, March 22, and May 25.

proceedings, notifications, and people attended by customer service. These statistics are shown at the monthly level and in cumulative terms for the current year. The changes made to the new homepage, which we refer to as simplified feedback, include the streamlining of information and the addition of statistics in percentage or rate terms.

For courts in Treatments 4 and 5, a pop-up window appears on top of the simplified homepage upon accessing Quantum (see Figure 3 in Appendix A.2). This window highlights three performance indicators: one of them is the indicator in which the court performed best, and the two others are the indicators in which the court performed worst, relative to a peer family court.[4] The pop-up window thus stresses the court's relative strengths and weaknesses, which lean into social comparison motivation. Note that the pop-up window always appears in addition to the simplified feedback homepage. In our analysis, we refer to the social comparison feedback treatment as a combination of the pop-up window and the simplified feedback.

Table 1 presents a summary of the different category labels discussed in this section, which we continue to use in the remainder of the paper.

Table 1: Treatment Category Labels

	C	T1	T2	T3	T4	T5
Email		✓		✓		✓
Simplified feedback			✓	✓		
Social comparison feedback					✓	✓
Feedback			✓	✓	✓	✓
Email x Feedback				✓		✓

(C) control; (T1) email; (T2) simplified feedback; (T3) email and simplified feedback; (T4) social comparison feedback; and (T5) email and social comparison feedback.

3.1 Data

Unless otherwise specified, we obtained the data for our study directly from the Chilean Judiciary's Administrative Corporation (CJAC). Our main court performance data comprise five monthly court indicators, starting four months prior to the launch of the intervention and up until the fifth and final month of the intervention. These indicators are computed by the CJAC and are fed into Quantum for the court managers' use. The first indicator is the *case clearance rate*, defined as the number of cases resolved over the number of incoming cases in a month. Second, the *timely motion resolution*

[4]Peer courts are established by the Chilean Judiciary as being similar courts given their competence (in this case, family) and their "size" which is proxied by the number of incoming cases in a year.

rate is computed as the number of motions signed within three working days as a ratio of total signed motion resolutions in a month.[5] Third, the *rate of realized hearings* is the number of hearings held after the first scheduling divided by the total scheduled hearings. Fourth, the *timely case resolution rate* is computed as the inventory of cases with an entry date shorter than two years as a ratio of the total cases in inventory. Finally, we define the *rate of timely hearing programming* as the number of hearings scheduled within 70 days as a ratio of the total number of scheduled hearings. These five measures allow us to assess changes across different case components and across short and long-term horizons (e.g., timely case resolution vs. case clearance). Each measure is constructed so that higher values indicate a speedier processing of the case—which, holding constant other factors—is associated with higher judicial efficiency.

Moreover, we complement the court performance data from the CJAC, which are aggregated at the court-month level, with publicly available case-level microdata from the website Judicial Power in Numbers.[6] Importantly, in this microdata, we are able to link each case to a unique court (and thus a specific court manager). The only monthly indicator that can be recreated using case-level data is case clearance; the recreated indicator and the official one closely match, with 0.996 correlation. More importantly, the case-level data allow us to investigate in more detail the number of incoming and concluded cases; the average duration of cases; and the number of days hearings take to be scheduled. Table 3 presents descriptive statistics on the 129,887 cases initiated during the treatment period. By December 31st, 2022—the latest date recorded in the case-level data—23 percent of cases were still ongoing, while the remaining 77 percent of cases had concluded in ten distinct ways. Among the different case endings, the most frequent was judgement, followed by cases where the demand was not accepted, and then cases that went through mediation. Conditional on conclusion (as of December 31st, 2022), the average duration of cases started in the treatment period is 72.4 days. For the 129,887 cases filed, 73,165 hearings were held during the treatment period, taking an average of 47.4 days to schedule.

Other variables related to the courts' characteristics and performance that we include in our analysis are pre-treatment indicators from 2019: number of incoming cases, number of hearings, case clearance, inventory older than one year, and inventory older than two years. We also have information on the managers' age, sex, and tenure. About two-thirds of court managers are men. They are on average 52 years old and have been in their position for on average 12 years.

[5] A motion is a written request or proposal to the court to obtain an asked-for order, ruling, or direction. There are a variety of motions, and it has become standard practice to file certain kinds of motions with the court based on the type of case.

[6] In Spanish, *Poder Judicial en Números*. The microdata are available at: `https://numeros.pjud.cl/Competencias/Familia`.

Table 2: Data sources

Source	Timeline	Usage
CJAC monthly indicators	October 2020 - June 2021	Five monthly court indicators for pre-treatment controls and main variables of interest
CJAC case level data	01/01/2019 - 12/31/2022	Analysis of case clearance, duration, hearings, and case resolution type
CJAC yearly indicators	2019	Pre-treatment balancing check and number of cases as strata variable
CJAC personnel data	October 2021	Court manager characteristics: age, sex, and years of experience are used as covariates.
Court manager survey	January 2020	Manager's testimony on their perceptions of their own positions and the Quantum platform
CJAC Quantum login data	July 2018 - August 2019 and January 2021 - June 2021	Court managers login analysis

Table 3: Case-level data for opened cases during the treatment period

129,887 new filed cases during the treatment period, of which 100,111 (77%) had being resolved by December 31st, 2022

Hearings during treatment period	Mean	SD
Days to schedule	47.4	30.9
Resolved cases	**Mean**	**SD**
Duration in days	72.4	102.2
Ongoing cases and resolved cases by type	**Freq.**	**Percent**
Judgement	39554	30.45
Ongoing	29776	22.92
Motion to dismiss in limine	20833	16.04
Mediation	14682	11.30
Incompetent court	8194	6.31
Conciliation	7317	5.63
Involuntary dismissal	2552	1.96
Settlement	2020	1.56
Voluntary dismissal (no resubmission)	2018	1.55
Settlement (II)	1762	1.36
Voluntary dismissal (resubmission allowed)	1179	0.91

Next, we have testimony on managers' perception of their own positions and Quantum collected in January 2020 (more information in Section 3.2). Finally, we have access to the information on logins into Quantum, both one month before the intervention, and during the five months in which the intervention took place. The login information gives the exact date and time of login for each manager. We have neither information on the duration of the access nor on which specific pages in the platform the managers visited. In the pre-treatment month of January 2020, 33 percent of court managers logged into Quantum at least once. A summary of the data sources discussed can be found on Table 2.

Tables 4 and 5 summarize our key variables at baseline for the treatment arms of feedback and email promotion, respectively. The first and second columns in each table present the mean of the control group and the treatment arm. The third and fourth

Table 4: Court Characteristics for No-Feedback and Feedback at Baseline

	No Feedback (1)	Feedback (2)	Difference (1-2) (3)	SE (4)
Panel A. Manager's Characteristics				
Age	52.06	52.00	0.06	(1.90)
Men	0.69	0.67	0.02	(0.15)
Years in position	12.31	12.30	0.01	(1.61)
January Quantum logger	0.31	0.33	-0.02	(0.15)
Number of Quantum logins in January	0.94	0.85	0.09	(0.41)
Panel B. Court Indicators (2019)				
2019 incoming cases	8799.19	8938.61	-139.42	(1668.42)
2019 hearings	5320.13	5275.33	44.79	(960.60)
2019 case clearance	75.54	74.30	1.24	(2.55)
2019 inventory older than 1 year	0.32	0.70	-0.38	(0.28)
2019 inventory older than 2 years	0.06	0.17	-0.11	(0.11)
2019 optimal no. staff gap	-0.50	-0.09	-0.41	(0.46)
2019 optimal no. judge gap	0.31	0.65	-0.35	(0.31)
Observations	16	33	49	49
Panel C. Court Indicators (0ct-Jan)				
Case rate	70.39	70.48	-0.09	(1.75)
Resolution rate	96.13	97.53	-1.41	(0.41)
Rate of realized hearings	69.16	60.01	9.15	(2.38)
Inventory -2 years	92.16	91.62	0.54	(1.90)
Rate of hearing programming	56.05	63.14	-7.09	(4.37)
Panel D. Micro data (Oct-Jan)				
Number of hearings	288.95	235.30	53.66	(22.77)
Number of incoming cases	557.06	541.80	15.27	(54.23)
Number of concluded cases	376.05	374.24	1.80	(35.53)
Observations	64	132	196	196

The no-feedback group includes those in the control group (C) and those receiving the email promotion (T1). January Quantum logger is a dummy variable equal to one if the court manager logged into Quantum at least once in January of 2021. The optimal number of staff and judge gaps refer to indicators built by the courts in order to understand the deficit or surplus in the number of judges and staff given the workload of the court.
†The years in the position of court manager has an upper bound of 16 years when the position was first created. 26 out of the 49 court managers have been in the position since its inception.

Table 5: Court Characteristics for No-Email and Email at Baseline

	No Email (1)	Email (2)	Difference (1-2) (3)	SE (4)
Panel A. Manager's Characteristics				
Age	51.35	52.78	-1.44	(1.77)
Men	0.62	0.74	-0.12	(0.14)
Years in position	11.85	12.83	-0.98	(1.51)
January Quantum logger	0.35	0.30	0.04	(0.14)
Number of Quantum logins in January	0.85	0.91	-0.07	(0.39)
Panel B. Annual Court Indicators (2019)				
2019 incoming cases	9074.15	8688.39	385.76	(1566.84)
2019 hearings	5347.85	5224.52	123.32	(902.47)
2019 case clearance	73.39	76.18	-2.79	(2.37)
2019 inventory older than 1 year	0.67	0.46	0.21	(0.26)
2019 inventory older than 2 years	0.18	0.08	0.10	(0.10)
2019 optimal no. staff gap	-0.27	-0.17	-0.10	(0.43)
2019 optimal no. judge gap	0.46	0.63	-0.16	(0.30)
Observations	26	23	49	49
Panel C. Monthly Court Indicators (0ct-Jan)				
Case rate	70.27	70.66	-0.39	(1.65)
Resolution rate	97.28	96.84	0.44	(0.39)
Rate of realized hearings	62.63	63.40	-0.77	(2.32)
Inventory -2 years	93.00	90.43	2.57	(1.76)
Rate of hearing programming	58.72	63.20	-4.47	(4.12)
Panel D. Micro data (Oct-Jan)				
Number of hearings	267.23	236.52	30.71	(21.59)
Number of incoming cases	552.95	539.80	13.15	(50.96)
Number of concluded cases	380.24	368.72	11.52	(33.37)
Observations	104	92	196	196

The no-email group includes those in the control group (C) and those receiving the feedback promotion (T2 and T4). January Quantum logger is a dummy variable equal to one if the court manager logged into Quantum at least once in January of 2021. The optimal number of staff and judge gaps refer to indicators built by the courts in order to understand the deficit or surplus in the number of judges and staff given the court's workload.
†The number of years in the position of court manager has an upper bound of 16 years for when the position was first created. 26 out of the 49 court managers have been in the position since its inception.

columns give the mean and standard error of the difference between the treatment and control groups. We consider five manager characteristics, nine annual court indicators for 2019, five monthly pre-treatment indicators from October 2020 to January 2021, and three monthly aggregated case-level statistics.

Before the treatment, the groups were similar on most variables considered. For the feedback treatment arm, out of the 22 variable differences reported in the third column in Table 4, there are just three instances where the estimated differences are statistically significant. In particular, for monthly indicators, the resolution rate is statistically higher; the rate of realized hearings is statistically lower; and the number of hearings held is statistically lower in the treatment group. There is no statistically significant difference between those that received the email promotion and those who did not, as seen in Table 5. Overall, we conclude that the random assignment of courts to treatment and control groups was largely successful; nevertheless, in our regression analyses below, we include as covariates the court manager's characteristics; all pre-treatment monthly indicators; and the pre-treatment number of hearings. By doing so, we control for any potential pre-treatment differences that, although not statistically significant, might be substantive in terms of magnitude and may have been imprecisely estimated in our balance check due to sample size limitations.

3.2 Survey Data: Manager's Indicator Knowledge

We developed a survey to measure court manager's perceptions on indicators, managerial practices, and the Quantum platform. Particularly, the survey asked about knowledge of their own court indicators (both in absolute terms and relative to other courts), their opinion on managerial practices, their actions as court managers, and, for certain randomly selected managers, their perception and usage of Quantum.

The survey was sent to the work email of all 346 Chilean court managers[7] on January 2020, including the family courts that our intervention focuses on. Note that this survey was sent one year before the intervention started. We received 121 surveys back from distinct court managers, of which 21 are within our intervention.[8]

Among survey respondents, 70% agree or strongly agree that tracking court indicators is one of the most important tasks in the job of court managers[9]. Furthermore,

[7]There are more courts than court managers as the civil courts have not yet been reformed, leaving some courts without managers.

[8]This constitutes a 35% response rate for all courts and 43 % rate within the intervention courts. The relatively low response rate limits the usage of the information from the survey to investigate the heterogeneous effects of the intervention. Still, it gives us the opportunity to assess managers' knowledge of their own indicators prior to the intervention.

[9]Among the remaining percentages, 1% strongly disagrees, 4.5% disagree and 24% are neutral

71% of court managers agree or strongly agree that the information in the Quantum platform is useful for their work. However, it is not evident that court managers know their court's indicators well. When asked to recall the two months previous case clearance, 40% of court managers were off by more than 25% from the true value. The average age and gender composition of respondents and non-respondents were similar; that said, respondents had a higher clearance rate than those who did not respond. One could expect that those who perform better are also more likely to better guess their indicators. Thus, we see the figures on the knowledge gap provided by the survey as a lower bound for the true gap.

4 Empirical Model

We consider the following specification for assessing the impact of the email promotion and feedback treatments on court efficiency:

$$Y_{nit} = \alpha_{n0} + \alpha_{n1} Email_i + \alpha_{n2} Simplified\ Feedback_i + \alpha_{n3} Social\ Comp.\ Feedback_i + \alpha_{n4}\mathbf{X}_i + \alpha_{n5}\mathbf{Y}_{nit_0} + \alpha_{n6}\mathbf{H}_{nit_0} + \alpha_{n7}\gamma_t + \xi_{nit}, \quad (1)$$

where Y_{nit} denotes the value of indicator n (i.e., one of the five CJAC productivity measures; or measures of case duration and days to schedule hearings that we construct with case-level data, as explained in Section 3.1) for court i in month $t \in$\{February, March, April, May, June\}. The dummy variables $Email_i$, $Simplified\ Feedback_i$, and $Social\ Comp.\ Feedback_i$ indicate that the manager of court i received the email promotion, simplified feedback, and social comparison feedback treatments, respectively. $\mathbf{X_i}$ is a vector of characteristics of court i, which includes the court's manager's sex, age, age square, and a dummy for high experience (more than 11 years in the position); as well as a dummy for large courts (strata).[10] The vectors $\mathbf{Y}_{nit_0}$ and $\mathbf{H}_{it_0}$ contain the values of the indicator n and the number of hearings in the pre-intervention months of October, November, December, and January.[11] Finally, γ_t is a month fixed effect.

The coefficient α_{n1} measures the average treatment effect on the treated with the email promotion; whereas α_{n2} and α_{n3} capture the intention to treat effects for the simplified and social comparison feedback treatments.[12] Note that not every court man-

about the statement

[10]The dummy for large courts equals 1 if the number of incoming cases in 2019 is above the median. This dummy is used as the strata variable in the treatment randomization

[11]Number of hearings in pre-intervention months are added as controls, given that Table 4 shows their average to be statistically different for courts in the feedback and no-feedback treatments.

[12]To be precise, α_{n1} measures the average treatment effect of email promotion on the treated (by definition, all compliers) conditional on two-thirds of the managers receiving one of the two feedback

ager who was assigned to the feedback treatments received them—as being exposed to the feedback treatments requires the manager to log into Quantum. We are able to estimate the local average treatment effect (LATE) of the feedback treatments—which, in our setting, is equivalent to the treatment on the treated (or, equivalently, the compliers), as no one in the no-feedback control group was exposed to feedback. The local average treatment effect consists of the impact of the treatment among managers who: (i) were in the feedback treatment group, and (ii) logged into Quantum at least once in the month. Thus, the LATE of the feedback treatment uses as *effective treatment* the logins into the platform and as an instrument of the treatment assignment. This estimator relies on two key assumptions: monotonicity—that is, the assignment to treatment does not make one less likely to login; and the exclusion restriction—that is, individuals respond to the treatment itself rather than to treatment assignment.

In our regressions of the official five monthly indicators, we standardize the dependent variable Y_{nit} using October to June's observations of the control group (C). As a result, these indicators have a standard deviation of one.

To complement our duration analysis exploring as dependent variable the days for cases resolved using specification (1), we also estimate a Cox proportional hazards model, which allows us to assess how the treatments in our study affect the rate of case conclusion. The following equation gives the hazard function, or risk of case conclusion at time t, for case i:

$$\lambda(t|X_i) = \lambda_0(t)\exp(\beta_{n1}Email_i + \beta_{n2}Simplified\ Feedback_i + \beta_{n3}Social\ Comp.\ Feedback_i + \beta_{n4}\mathbf{X}_i + \beta_{n5}\mathbf{Y}_{nit_0} + \beta_{n6}\mathbf{H}_{nit_0}),$$

with the same explanatory variables as in equation (1) minus the month fixed effects. Relative to (1), the Cox model has the advantages of accounting for right-censoring—that is, the model explicitly incorporates information from cases that did not resolve by the end of our sample period.

We also investigate how the treatments affect the way the courts process cases. With this intent, we consider a discrete-choice model, in which the possible choices

treatments. Similarly, α_{n2} and α_{n3} measure the intention to treat effects conditional on half of the managers in each treatment group receiving the email promotion. We opted for a concise econometric model over one with all treatments and interactions given the limited sample size. The factorial design was intended for an intervention with more than 300 courts; however, due to institutional restrictions, the number of participating courts was ultimately limited to just 50. To maximize statistical power, we consider this concise specification and present the results for the full treatments and interactions in the Appendix.

are the different case resolution types. Specifically, we employ a multinomial logistic regression to model the choices. Let k denote one of the ten possible types of case endings (see Table 3), with ongoing cases (that is, not having the case resolved) as the reference group. The probability that a case resolves as k is then given by

$$\Pr(E_i = k) = \frac{e^{\boldsymbol{\delta}_k \cdot \mathbf{X}_i}}{1 + \sum_{j=1}^{K-1} e^{\boldsymbol{\delta}_j \cdot \mathbf{X}_i}}, \tag{2}$$

where

$$\begin{aligned}\boldsymbol{\delta}_k \cdot \mathbf{X}_i =& \delta_0 + \delta_1 Email_i + \delta_2 Simplified\ Feedback_i + \delta_3 Social\ Comp.\ Feedback_i \\ &+ \delta_4 \mathbf{X}_{it} + \delta_5 \mathbf{E}_{t_0} + \delta_6 \mathbf{I}_{it_0} + \delta_7 \mathbf{H}_{it_0} + \delta_8 \gamma_t.\end{aligned}$$

In this specification, the vectors $\mathbf{E}_{t_0}$ and $\mathbf{I}_{it_0}$ consist of the average share of conclusion types and the inventory older than two years for the pre-intervention months of October, November, December, and January. The inclusion of $\mathbf{E}_{t_0}$, in particular, is akin to controlling for pre-treatment lagged terms of the dependent variable.

5 Results

Table 6 presents the local average treatment effects (LATE) of the distinct treatments for the five monthly court indicators.[13] The impact of the email promotion on case clearance cannot be distinguished from zero. In contrast, the simplified feedback has a large and statistically significant positive impact on the case clearance rate—increasing the average case clearance rate by 0.9 standard deviations for those that were treated.[14] The impact of the social comparison feedback treatment is large and not statistically different from that of simplified feedback, although not statistically significant.

For the timely motion resolution, both types of feedback have a statistically significant positive impact. Particularly, the positive impact of the social comparison feedback is 0.34 standard deviations, followed by the simplified feedback, with an increase of 0.27 standard deviations.

In contrast to the previous findings, column (3) in Table 6 shows a negative impact of all three treatments on the rate of realized hearings (number of hearings held after

[13] To compare the intention to treat effects (ITT) and local average treatment effects (LATE), please refer to Table 13 in Appendix A.6.1

[14] As explained in Section 4, footnote 12, our estimates of the simplified and social comparison feedback treatment effects are conditional on half of the managers in each treatment group receiving the email promotion. Similarly, the estimated treatment effect of email promotion is conditional on two-thirds of the recipients also receiving the feedback treatments. For exposition simplicity, we omit these qualifications in the remainder of the discussion of the results.

Table 6: The Local Average Treatment Effects for Email, Simplified Feedback and Social Comparison Feedback

	Case Clearance†	Timely Motion Resolution	Realized Hearings	Timely Case Resolution	Timely Hearing Programming
	(1)	(2)	(3)	(4)	(5)
Email promotion	0.0924	0.0104	-0.284***	0.0684*	-0.0823
	(0.145)	(0.0378)	(0.0957)	(0.0389)	(0.0665)
Simplified feedback	0.912**	0.266**	-0.525*	0.0675	0.758***
	(0.455)	(0.109)	(0.315)	(0.101)	(0.266)
Social comparison	0.500	0.344**	-1.055**	0.00826	0.0626
	(0.621)	(0.134)	(0.471)	(0.140)	(0.303)
N	245	245	245	245	245

All regressions have as covariates the strata variable, three manager characteristics, four pre-treatment lagged values of the dependent variable and number of hearings, pre-treatment login dummy, and month-fixed effects. Standard errors are clustered at the court level and bootstrapped. Intention to treat effects and the comparison to the local average treatments are found in Table 13.
† Similar magnitudes are estimated for case clearance if the dependent variable is built from case-level data.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

the first scheduling divided by the total scheduled hearings). The negative effects of the simplified and social comparison feedback treatments, in particular, are high—amounting to decreases of 0.5 and 1.1 standard deviations, respectively. What may be behind these negative effects? First, we can discard the possibility of them being driven by a lack of exposure of managers in the feedback treatments to the realized hearings rate indicator in the reformulated dashboard. In fact, the simplified feedback homepage displays the number of realized hearings and its comparison to the previous month in a prominent area; furthermore, we also estimate a negative impact for the email promotion treatment. Second, treated managers could divert court resources and the staff's effort away from the realization of hearings and towards other activities such as the resolution of motions (or, similarly, treated managers could redirect resources to cases that typically require less hearings to resolve). Yet, this type of resource reallocation is unlikely to be the main driver of the result, as the rate of timely hearing programming increases for treated managers (see below).[15] A third, more plausible explanation is a change in the composition of the types of hearings scheduled by treated managers; that is, it is possible that, after treatment, managers increase the scheduling of hearings that are more resource-consuming, leading to a drop in the realized hearings rate.

As for the timely case resolution rate (that is, the rate of cases in the court caseload

[15]The decrease in the realized hearings rate following the treatments does not seem to be associated with the increase in the timely hearing programming rate either; an OLS regression of the realized hearings rate on the timely hearing programming rate returns small, non-statistically-significant coefficients.

with a duration shorter than two years), we find no statistically significant treatment effects for the feedback treatments (Table 6, column (4)). Given the longer-term horizon of this indicator and the relatively short span of the panel that we analyze, these null results are perhaps unsurprising.

Finally, we find that the simplified feedback treatment increases the timely hearing programming rate by 0.8 standard deviations. The effect of the social comparison feedback treatment on this variable is not statistically significant. Accordingly, the effects of the simplified and social comparison feedback treatments are statistically different from each other at the 1% significance level.

Table 7: Feedback Treatments Expedite Case Resolution

	Case resolution hazard rate complement	Case duration in days	Days to schedule hearings
	(1)	(2)	(3)
Email Promotion	-0.03	1.12	2.89
	(0.03)	(3.46)	(2.24)
Simplified Feedback	0.06**	-8.09	-3.11
	(0.03)	(9.71)	(9.63)
Social Comparison Feedback	0.06*	-19.82	-8.37
	(0.04)	(12.18)	(12.17)
Dependent variable mean	–	72.43	47.39
Observations	129,887	100,111	73,165

All regressions have as covariates the strata variable, three manager characteristics, four pre-treatment lagged values of the dependent variable and number of hearings, pre-treatment login dummy, and month fixed effects. Standard errors are clustered at the court level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

To further explore the impacts seen on the monthly established court indicators, we turn our analysis to case-level data. Given that case clearance improves with the feedback treatment arms as seen in column (1) in Table 6, one would expect that cases are concluding faster, driving the number of cleared cases up. This is in line with the results of the Cox regression analysis shown in column (1) of Table 7, which indicate that both the simplified and social comparison feedback treatments increase the hazard rate of case resolution by six percent (significant at the five and ten percent levels, respectively). Columns (2) and (3) of Table 7 display the OLS results from specification (1), using as dependent variables the case duration in days and the number of days needed to schedule hearings (conditional on the hearings being held). It is worth stressing that the OLS specification does not account for right censoring—that is, it ignores information from cases that were still open by the end of the sample period. Although the estimates in columns (2) and (3) are imprecise, they are overall consistent with the results discussed above. Specifically, they suggest that the simplified and social comparison treatments reduce the average case duration by

8 and 20 days, respectively, besides reducing the number of days needed to schedule hearings held.

Our results so far indicate that the feedback treatments increase the speed at which the affected courts process cases. A natural follow-up question is: do the interventions also affect the final outcome of cases? In the context of the 129,887 cases that were filled during the treatment period, we use a multinomial logistic regression to examine changes to case endings using ongoing cases as the reference group, as defined in (2). That is, the multinomial logistic regression allows us to predict the probabilities of the different possible outcomes or endings for cases concluded relative to the probability that cases remain ongoing. Table 8 shows the results. For ease of interpretation, the table displays both the estimated coefficients and the marginal effects; for instance, considering the "involuntary dismissal" and the influence of the simplified feedback treatment, a coefficient of -0.413 indicates a decrease in the relative log odds of "involuntary dismissal" compared to ongoing cases. Meanwhile, the corresponding marginal effect suggests that the simplified feedback leads to a 0.9% reduction in the likelihood that a case ends by involuntary dismissal, assuming all the other covariates are held at their average values.[16]

Overall, the marginal effects for ongoing cases and the three most common types of endings (judgement, motion to dismiss in limine, and mediation) are not affected by the feedback treatments. Small reductions in probability are observed for the feedback treatments in case endings due to involuntary dismissal (2% of cases and determined by parties) and incompetent court (6.3% of cases and decided by judges at the beginning of the case process). In contrast, there are small increases in the probability of ending by settlement (11.3% of cases and determined by parties) and ending in voluntary dismissal with and without the possibility of resubmission (0.9% of cases and determined by parties). The feedback intervention shows a small, negative effect on the probability that a case remains open as of December 31st, 2022. Although not statistically significant, this negative effect is consistent with the results reported in Tables 6 and 7 regarding the impact of the feedback intervention on case clearance and case duration.

As for the other common ending types, the feedback treatments did not significantly affect their likelihood. Thus, the finding that the interventions reduce case du-

[16]The statistical significance of coefficients and marginal effects might not always align, which can be due to various factors. For instance, small sample sizes could limit the detection of significant effects for individual coefficients, whereas marginal effects might gain significance through aggregation across a larger portion of data. Additionally, coefficient estimates capture log-odds changes relative to a reference category and might not be statistically significant due to non-linear relationships between predictor variables and log-odds. In contrast, marginal effects, being more direct measures of probability change, might exhibit significance

Table 8: Multinomial Logistic Regression by Type of Case Endings

Ongoing case	Coef.	Marg.Eff.
Simplified Feedback	0.000	-0.007
	(.)	(0.011)
Social Comparison Feedback	0.000	0.001
	(.)	(0.012)
Email Promotion	0.000	-0.011
	(.)	(0.009)
Involuntary dismissal	Coef.	Marg.Eff.
Simplified Feedback	-0.413**	-0.009**
	(0.183)	(0.004)
Social Comparison Feedback	-0.392*	-0.008*
	(0.226)	(0.005)
Email Promotion	-0.225	-0.005*
	(0.153)	(0.003)
Settlement (II)	Coef.	Marg.Eff.
Simplified Feedback	-0.046	-0.001
	(0.198)	(0.003)
Social Comparison Feedback	0.117	0.002
	(0.189)	(0.003)
Email Promotion	0.076	0.000
	(0.161)	(0.002)
Conciliation	Coef.	Marg.Eff.
Simplified Feedback	-0.007	-0.002
	(0.097)	(0.004)
Social Comparison Feedback	-0.044	-0.002
	(0.129)	(0.006)
Email Promotion	-0.102	-0.008*
	(0.095)	(0.005)
Voluntary dismissal (no resubmission)	Coef.	Marg.Eff.
Simplified Feedback	0.126	0.001
	(0.113)	(0.001)
Social Comparison Feedback	0.194*	0.003**
	(0.112)	(0.002)
Email Promotion	-0.031	-0.001
	(0.085)	(0.001)

Incompetent court	Coef.	Marg.Eff.
Simplified Feedback	-0.116	-0.009***
	(0.082)	(0.003)
Social Comparison Feedback	-0.213**	-0.013***
	(0.092)	(0.003)
Email Promotion	0.126	0.005
	(0.084)	(0.003)
Mediation	Coef.	Marg.Eff.
Simplified Feedback	0.110	0.009
	(0.082)	(0.009)
Social Comparison Feedback	0.017	0.002
	(0.082)	(0.009)
Email Promotion	0.126*	0.009
	(0.070)	(0.007)
Motion to dismiss in limine	Coef.	Marg.Eff.
Simplified Feedback	0.068	0.006
	(0.099)	(0.010)
Social Comparison Feedback	0.046	0.008
	(0.113)	(0.012)
Email Promotion	-0.006	-0.008
	(0.080)	(0.008)
Voluntary dismissal (resubmission allowed)	Coef.	Marg.Eff.
Simplified Feedback	0.257**	0.002**
	(0.126)	(0.001)
Social Comparison Feedback	0.121	0.001
	(0.165)	(0.001)
Email Promotion	0.070	0.000
	(0.143)	(0.001)
Judgement	Coef.	Marg.Eff.
Simplified Feedback	0.056	0.008
	(0.063)	(0.007)
Social Comparison Feedback	0.011	0.004
	(0.067)	(0.008)
Email Promotion	0.101*	0.016**
	(0.054)	(0.007)
Settlement	Coef.	Marg.Eff.
Simplified Feedback	0.132	0.002
	(0.119)	(0.001)
Social Comparison Feedback	0.172	0.003**
	(0.122)	(0.001)
Email Promotion	0.315***	0.004***
	(0.102)	(0.001)

The covariates include strata variable, three manager characteristics, pre-treatment shares of each case type ending, pre-treatment percentage of cases with more than two years duration, pre-treatment login dummy, and month fixed effects. Standard errors are clustered at the court level. The ongoing case category is used as the reference group for the coefficient results.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

ration, suggests that, while cases are being expedited, the nature of case conclusions—potentially indicative of judicial decision-making quality—remains largely unaffected or, if anything, has slightly improved, with a smaller portion of cases ending in involuntary dismissal and incompetent courts.

As a complement to the findings reported in this section, in Appendix A.6 we assess the impact of the email promotion and feedback interventions on the login behavior of court managers. Our results from that analysis suggest that email increases the usage of Quantum. Specifically, three rounds of email promotions increased the number of logins per month by 0.4 logins—a 37.4 percent increase compared to the control group, although the effect is not statistically significant. As for the feedback treatments, the evidence does not suggest that they affect the number of logins positively. We refer the interested reader to Appendix A.6.2 for further details.

Thus, after controlling for manager characteristics and pre-treatment behavior, the impact of simplified feedback becomes evident: it increases the performance for case clearance, timely motion resolution, and hearing programming while it decreases the rate of realized hearings. For social comparison feedback, the positive effects are only statistically significant for timely motion resolution. The negative impact on first scheduled realized hearings does not seem to suggest that managers divert effort away from hearings, as timely hearing programming improves and the number of days it takes to schedule hearings decreases (although the latter effect is not statistically significant). Also, the negative impact on this particular indicator does not necessarily point to a worsening of the productivity of the judicial system since case clearance, which is largely considered the main court indicator that encompasses all other measures, improves with the simplified feedback and also has positive point estimates for the other treatments. The case clearance indicator improves as the average duration for concluded cases decreases with the feedback treatments. Additionally, the treatments do not seem to have substantially altered the probability of cases ending differently, which can be interpreted as an indication that case quality remains relatively constant despite the reduction in case duration.

5.1 Heterogeneity

In this section, we explore the heterogeneity of the treatment effects by the number of years of experience.[17] Given that Quantum was only launched in 2018, it is likely

[17]Although envisioned in the Pre-Analysis Plan (see Appendix A.1), we cannot explore the changes in the knowledge of Quantum indicators as a post-treatment survey was not conducted; yet, given the negative correlation found between years of experience and the Quantum platform usage, we instead explore using this variable for heterogeneity treatment effects.

that more experienced court managers developed management strategies and habits that do not depend largely on accessing court statistics. As one may expect, younger and less experienced court managers log more into to Quantum than their older and more experienced counterparts, as seen in Table 14 in Appendix A.6.

It is not ex ante clear whether experience would increase or decrease the impact of the information treatments. On one hand, managers with fewer years of experience or younger are more likely to be already aware of their court statistics from their previous Quantum usage and thus may learn less from the new information of the Quantum intervention; on the other hand, these managers may be more willing to adapt their management practices, in light of the new information provided by the treatments. The opposite can be true for older and more experienced court managers: they may have larger information gains from the information in Quantum, but may be less willing to explore new alternatives to their management strategies, as their management habits may have already solidified.

Table 9: Heterogeneous Treatment Effects of Feedback by Experience

	Case Clearance	Timely Motion Resolution	Realized Hearings
	(1)	(2)	(3)
Email Promotion	0.091	-0.003	-0.254**
	(0.160)	(0.054)	(0.106)
Simplified feedback	0.830*	0.195	-0.877**
	(0.480)	(0.145)	(0.384)
Simplified feedback * High experience	0.196	0.098	0.585
	(1.124)	(0.232)	(0.700)
Social comparison feedback	0.441	-0.135	-0.931***
	(0.625)	(0.137)	(0.327)
Social comparison feedback * High experience	0.121	0.821**	-0.319
	(1.290)	(0.409)	(0.857)
High experience	0.215	-0.248**	-0.020
	(0.339)	(0.100)	(0.196)

	Timely Case Resolution	Timely Hearing Programming
	(4)	(5)
Email Promotion	0.060	-0.070
	(0.041)	(0.059)
Simplified feedback	-0.063	0.625***
	(0.101)	(0.224)
Simplified feedback * High experience	0.264	0.370
	(0.252)	(0.475)
Social comparison feedback	-0.217	0.273
	(0.161)	(0.279)
Social comparison feedback * High experience	0.429	-0.258
	(0.484)	(0.510)
High experience	-0.027	0.186
	(0.096)	(0.114)
N	245	245

All regressions have as covariates the strata variable, three administrator characteristics, four pre-treatment lagged values of the dependent variable, pre-treatment login dummy, and month fixed effects.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9 shows the heterogeneous effects of the treatments by experience for the

five distinct indicators. The court managers are divided between those with low experience (0-11 years of experience, corresponding to 22.5 percent of the managers in our sample), and those with high experience (12-16 years of experience, comprising the remaining 77.5 percent of the sample). As shown in column (2), at the five percent significance level, the impact of the social comparison feedback on timely motion resolution is higher for more experienced court managers. That is, having eleven or more years of experience and receiving the social comparison feedback treatments increases the timely motion resolution rate by 0.8 standard deviations. Meanwhile, more experienced managers tend to underperform in the motion resolution rate by 0.3 standard deviations in the baseline. Still considering column (2), the coefficient for the interaction term between high experience and the simplified feedback treatment is positive but not significant at conventional levels. Similarly, the coefficients associated with case clearance (column (1)) indicate positive interactions between high experience and each of the feedback treatments, but the effects are not statistically significant. Overall, Table 9 estimates are noisy, but they suggest that the feedback treatment effects are not smaller for managers with more years of experience; if anything, they provide some evidence that more experienced managers benefit more from the feedback interventions.

6 Conclusion

In this study, we explored the underutilization of performance data in court systems and its potential in enhancing court management. Collaborating with Chile's Department of Institutional Development, we assessed how providing performance metrics to court managers could ameliorate information frictions and improve judicial efficiency.

Our factorial randomized control trial revealed significant information gaps among court managers, many of whom were unfamiliar with their court's performance indicators. To address this, we employed a three-pronged intervention on an online platform: promoting usage via email, streamlining the homepage to highlight key statistics, and introducing peer court comparisons for benchmarking.

The results were telling. Simplified access to court statistics led to improvements in key performance metrics, such as case clearance rates, motion resolution timeliness, and hearing scheduling. Social comparison feedback further enhanced timely motion resolution, though its impact was more nuanced. Interestingly, both interventions correlated with shorter case durations without compromising—or even slightly enhancing—the quality of judicial decision-making, as evidenced by fewer cases ending in involuntary dismissal or incompetent court rulings.

Contrary to expectations, the effectiveness of these interventions was not diminished by the experience level of court managers, indicating an equitable benefit across different user demographics. This finding underscores the potential of leveraging existing technologies for institutional improvements without exacerbating technological divides.

Looking ahead, these encouraging outcomes suggest fertile ground for further exploration. Future research could investigate how advancements in AI might refine the presentation of judicial performance data, optimizing its utility for court managers. Such studies would contribute to a deeper understanding of how technology can streamline information flow, reduce frictions, and ultimately enhance public sector efficiency.

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A Appendix

A.1 Pre-Analysis Plan

AEA RCT Registry

The American Economic Association's registry for randomized controlled trials

Welcome back, Paloma!

Sign out Profile My Trials

About Registration Guidelines Data FAQ Advanced Search SEARCH

INFORMATION PROVISION AND COURT PERFORMANCE: EXPERIMENTAL EVIDENCE FROM CHILE

LAST REGISTERED ON JUNE 17, 2021

VIEW TRIAL HISTORY

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Pre-Trial

Trial Information

GENERAL INFORMATION

Title
Information Provision and Court Performance: Experimental Evidence from Chile

RCT ID
AEARCTR-0005512

Initial registration date
December 06, 2020

Initial registration date is when the trial was registered.

It corresponds to when the registration was submitted to the Registry to be reviewed for publication.

First published
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First published corresponds to when the trial was first made public on the Registry after being reviewed.

Last updated
June 17, 2021, 4:42 AM EDT

Last updated is the most recent time when changes to the trial's registration were published.

LOCATIONS

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Chile

Region
National

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ADDITIONAL TRIAL INFORMATION

Status
In development

Start date
2020-01-01

End date
2021-09-30

Keywords
Behavior, Governance

Additional Keywords
Judicial, tribunal, judicial system, behavioral, information provision, Chile

JEL code(s)

D04

Secondary IDs

H43, D63

Abstract

Previous studies have shown that behavioral nudges can be a cost-effective tool to influence changes in people's actions. In this study, we aim to test whether nudging court managers through informing them on how their court performs in absolute and relative terms can improve court productivity. Moreover, we test if there is any difference if the information about the court performance is given in contrast and relation to self past performance or if the information is relative to other courts' performance.

External Link(s)

REGISTRATION CITATION

Citation

Carrillo, Paloma et al. 2021. "Information Provision and Court Performance: Experimental Evidence from Chile." AEA RCT Registry. June 17. https://doi.org/10.1257/rct.5512-1.1

Sponsors & Partners

PARTNER

Name

Department of Institutional Development (DDI) at the Administrative Corporation of the Chilean Judiciary (CAPJ)

Type

government

URL

Experimental Details

INTERVENTIONS

Intervention(s)

In this study, we aim to test whether nudging court managers through informing them on how their court performs in absolute and relative terms can improve court productivity.

Intervention (Hidden)

The Department of Institutional Development (DDI) of the Chilean judicial system developed an electronic platform called Quantum in 2018. Quantum displays comprehensive information on court indicators, such as the number of cases filed, the case clearance rate, the average duration of cases finished in a month, and the percentage of realized hearings. It also allows users to compare their courts to other courts in the

same jurisdiction. Quantum was launched in 2018, but take-up has been limited: 20% of court managers have never logged in, and overall there is an average of 20 logins per court manager in 1 year and 2 months. The platform is technologically well developed and rich in information, yet it is unclear whether it has any impact on the management of the court. Our project consists of evaluating an intervention through a randomized controlled trial (RCT) with two main branches. First, we will (randomly) promote the Quantum platform in multiple ways, such as sending court managers a survey that implicitly markets the platform, making phone calls, and sending them emails. Second, we will (also randomly) provide court managers a new dashboard that summarizes the main statistics displayed in Quantum and compares them to themselves to a reference group of courts. There would be a total of six distinct intervention or treatments:

Treatment 0: Control. No change to their Quantum dashboards nor provided with any Quantum promotion.

Treatment 1: Quantum Promotion
The tribunals randomized into Treatment 1 will have their court staff receive both emails with a Quantum link to increase accessibility and salience of Quantum, and a small baseline and post-intervention survey that includes Quantum promotion. The baseline survey given to the court managers at the beginning of the RCT will ask them about their beliefs about some productivity metrics, how much these metrics affect their decision at work, inform them that these metrics can be seen in Quantum, and describe the effect of Quantum usage on people's productivity through the results of an event study using historical data. A sample survey is provided in the appendix.

Treatment 2: No Quantum Promotion + New Dashboard
The tribunals randomized into treatment 2 will not receive any promotion but will have their home page in Quantum, what we call the dashboard, present various statistics at the tribunal level.

Treatment 3: Quantum Promotion + New Dashboard
The tribunals randomized into treatment 3 will receive the same promotion as that in treatment 1 and the new dashboard as in Treatment 2.

Treatment 4: No Quantum Promotion + New Dashboard + Comparative to others
The tribunals in treatment 4 will receive the new dashboard plus another tab or pop-up window that focuses on the tribunal's best performing and worst-performing dimension from the previous month in comparison to the performance of peer tribunals (same competence) in the same month. This comparison leans into social comparison motivation.

Treatment 5: Quantum Promotion + New Dashboard + Comparative to others
The tribunals in treatment 4 will receive the new dashboard plus another tab or pop-up window that focuses on the tribunal's best performing and worst-performing dimension from the previous month in comparison to the performance of peer tribunals (same competence) in the same month. This comparison leans into social comparison motivation.

The court managers' job satisfaction level will be measured with pre and post-surveys to court managers that measure perceptions of their tribunals and their satisfaction with their positions. By informing the court managers about their court's standing in the new dashboard and comparative to others, this could change how empowered or satisfied a court manager is with his or her position and power role.
Overall, the objectives of the survey for court staff are threefold. First, it will measure their knowledge of Quantum statistics. How close or far is their perception of their court's performance from the truth. We can later use this information (prior beliefs) to understand if greater access to Quantum updates the beliefs closer to the truth when we measure their posteriors (survey at the end of intervention). Notice that the measurement of beliefs and opinions is something unique to the survey that the rest of the interventions cannot. Second, the survey will allow us to understand if the court staff find the statistics important and in what order of importance. This is useful for Quantum to know which variables are important for users and make them more salient in the dashboard or in the rest of the Quantum pages. That is, the results from the survey can help tailor the intervention to make it more effective. Third, the survey will promote Quantum as a source of accurate and useful information through the event study results. This may help influence those that are skeptical of Quantum to give it a chance.

Intervention Start Date

2020-12-14

Intervention End Date

2021-09-30

PRIMARY OUTCOMES

Primary Outcomes (end points)

Case clearance rate, average length for filing cases (days), average length for ending cases, the average time the court needs to provide a written submission during the consultation period, percentage of writing resolved with 3-5 days, average number of days to program a hearing, percentage of hearing that started with a delay of 15 minutes, percentage of cases pending for more than 1-2 years, appeal rate, and number of cases appealed.

On the promotion intervention, the main primary outcome is number of logins per court manager to the Quantum platform

Primary Outcomes (explanation)

SECONDARY OUTCOMES

Secondary Outcomes (end points)

Court managers job satisfaction

Secondary Outcomes (explanation)

The court managers' job satisfaction level will be taken from the pre and post-surveys to court managers that measure perceptions of their tribunals and their satisfaction with their positions. By informing the court managers about their court's standing it could change how empowered or satisfied a court manager is with his or her position and power role.

EXPERIMENTAL DESIGN

Experimental Design

The program will have six distinct treatments. The treatments will combine promoting the usage of an electronic platform that contains information on their court performance and providing distinct homepages in this platform that will summarize the courts performance stressing the weaknesses and strengths of the court in comparison to a reference group.

Experimental Design Details

First, we will (randomly) promote the Quantum platform in multiple ways, such as sending court managers a survey that implicitly markets the platform, making phone calls, and sending them emails. Second, we will (also randomly) provide court managers a new dashboard that summarizes the main statistics displayed in Quantum and compares them to themselves in the past or to a reference group of courts. There would be a total of six treatments: (0) no quantum promotion no new dashboard (control) (1) quantum promotion, (2) no quantum promotion and new Quantum dashboard, (3) quantum promotion and a new dashboard, (4) no quantum promotion, new dashboard, and comparative that emphasizes the strongest and weakest indicators for that month in comparison to a similar group of courts in that same month, and (5) quantum promotion, new dashboard, and comparative that emphasizes the strongest and weakest indicators for that month in comparison to a similar group of courts in that same month.

Given that the information in the Quantum platform is updated daily and our dashboards are updated with monthly data, we will have multiple pre-treatment observation and many post-treatment observations.

Randomization Method

Randomization done in office by a computer.

Randomization Unit

The unit of randomization is the court. The randomization was stratified by size (small and big) and court type (7 distinct ones).

Was the treatment clustered?

No

EXPERIMENT CHARACTERISTICS

Sample size: planned number of clusters

346 courts

Sample size: planned number of observations

346 courts

Sample size (or number of clusters) by treatment arms

57 courts stay as control, 57 courts receive T1, 58 courts receive T2, 58 courts receive T3, 58 courts receive T4, and 58 courts receive T5.

Minimum detectable effect size for main outcomes (accounting for sample design and clustering)

Supporting Documents and Materials

IRB

INSTITUTIONAL REVIEW BOARDS (IRBS)

IRB Name

Toulouse School of Economics

IRB Approval Date

2020-01-18

IRB Approval Number

N/A

Analysis Plan

Post-Trial

Post Trial Information

Data Publication

Reports, Papers & Other Materials

A.2 Survey to Court Managers

A baseline survey was rolled out to all 346 court managers to capture managers' perceptions on their roles and the Quantum platform. The survey was launched at the end of January of 2020, and responses were collected until the end of March of 2020. The survey was sent internally by the Department of Institutional Development of the Chilean Judiciary by email to all 346 court administrators. The baseline survey had four sets of questions related to (1) the perception of the performance of the tribunal, (2) their feedback on their job position and obstacles, (3) the knowledge and usage of Quantum, and (4) promoting and disclosing relevant information about Quantum. The questions related to knowledge and usage, and promotion of Quantum were asked to a subset of the population (a survey treatment group).

We received 132 responses, representing a 38.2% response rate, which span all different types of courts and across all seventeen Chilean jurisdictions. The survey's key findings can be divided into the first three main topics. First, regarding court performance and indicators, court managers strongly agree that court indicators are important to know for their job (see Table 10). Yet, court managers cannot accurately recall their courts' performance based on the most common indicator of case clearance. Furthermore, court managers are more likely to over-predict their performance compared to other tribunals. Second, one of the main actions taken by court managers in response to indicators is improving the scheduling of hearings (see Table 11 below for other responses). Court managers find the main barrier to their position is the power dynamics between court managers and judges. Third, Quantum is underutilized. About one-tenth of the court managers do not know about Quantum, and 17% do not use it. Older tribunal administrators are less likely to use Quantum. Of the court managers that are Quantum users, 69% are not using the platform to inform their work decisions. The main comment regarding improvements to Quantum is that it could include additional statistics and information.

Table 10: Descriptive Statistics on Managerial Practices

Statement	Mean	1-Strongly Disagree	2-Disagree	3-Neutral	4-Agree	5-Strongly Agree
Knowledge of indicators	4.67	0	1	2	31	82
Decision based on indicators	4.44	0	0	8	49	59
Satisfied with impact	4.38	0	1	3	63	49
Tracking indicators important	3.91	1	5	28	52	30
Indicators influence decisions	4.18	0	1	13	66	36
Many actions to improve performance	4.40	0	1	5	57	53
Work is relevant for well functioning court	4.69	0	0	0	36	80
Obstacles to improve performance	3.78	3	15	19	47	32

Responses from the court managers survey.

Table 11: Impact of Court Indicators on Court Manager's Actions

Court manager's response actions based on the following indicators			
Number of incoming cases	Number of pending cases	Number of resolved cases	Rate of realized hearings
Courtroom distribution/ agenda (24%)	Review causes of cases on hold (16%)	Avoid cancelling/rescheduling hearings and look over agenda (21%)	Effectiveness in scheduling hearings and preventing cancellation (43%)
Balance of workload/ redistribution of tasks (15%)	Ensure hearings occur (13%)	Strengthen reviewing causes (14%)	Improve usage of courtrooms (13%)
Increase number of judges, employees and/or hearings (9%)	Increase number of hearings/ schedule simultaneous hearings/ improve scheduling (10%)	Improve effectiveness of courtrooms (7%)	Distribute hearings by topic (8%)
	Balance workload (8%)		

Percentages based on text analysis from court managers survey responses.

A.3 Email Versions

A.3.1 Email on January 26

Dear Court Managers,

Hoping that you are well, we remind you that for a couple of years, the institution has advanced in the construction of the Quantum management tool, which consolidates different jurisdictional indicators by court, in order to provide information for decision-making. This tool has been valued by many courts, since it allows simplifying the consolidation of statistical data to support jurisdictional work.

Did you know ...?

Courts that use Quantum the most generally have a higher term rate. That is, for each case admitted, they tend to solve a greater number of cases in proportion.

Courts that use Quantum the most generally have a smaller inventory of old cases.

For those with feedback treatment
"During the last months, we have worked with a team of court managers in the construction of a new dashboard, which displays key indicators, necessary to support the management of family courts. In this sense, we invite you to log into Quantum and explore this new functionality. This dashboard also incorporates a window that compares the performance of the courts with a court of similar characteristics to yours."

You can access this platform at https://quantum.pjud (through VPN). To access the new dashboard, they must click on the name of their court within their jurisdiction. In case of any observation, requirement and even if you do not have your login credentials, please write to the email quantum@pjud.cl.

A.3.2 Email Promotion in February, March, and May

Dear Court [Name],

Please join us in congratulating the family court managers who used the Quantum platform the most during [previous month] 2021:

Name of manager 1 - Name of court 1

Name of manager 2 - Name of court 2

Name of manager 3 - Name of court 3

For those with at least one login on previous month:
"We trust that all of you will continue to use Quantum to track your indicators, evaluate your court's performance, and compare it to other courts."

For those with no logins on previous month:
"We noticed that you did not log into Quantum during [previous month] 2021. You are missing the opportunity to track your metrics, evaluate your court's performance, and compare it to other courts!"

Did you know that..

Most Quantum users find Quantum easy to use, displays information clearly, contains reliable indicators, and information that is useful and relevant to their work. Family courts that use Quantum multiple times a month have higher rates of termination of cases pending for more than two years.

You can access this platform at https://quantum.pjud (through VPN). To access the new dashboard, they must click on the name of their court within their jurisdiction. In case of any observation, requirement and even if you do not have your login credentials, please write to the email quantum@pjud.cl.

A.4 Minimum Detectable Effect

Table 12: Minimum Detectable Effect in Standard Deviations

	Email Promotion vs. No Email	Feedback vs No Feedback
Case Clearance	0.43	0.46
Timely Motion Resolution	0.52	0.55
Realized Hearings	0.42	0.54
Timely Case Resolution	0.52	0.57
Timely Hearing Programming	0.48	0.54

These are the minimum detectable effect in standard deviations computed using the ANCOVA methodology and setting power at 80%, alpha 0.05, 25 observations for control and treatment, 4 pre-treatment observations, and 5 post-treatment observations.

For the five main indicators of interest, the minimum detectable effect, considering power at 80%, alpha at 0.05, and the 49 tribunals and the number of monthly obser-

vations, is between .42 and 0.57 standard deviations. According to Cohen (1988), an effect of 0.2 standard deviation is "small", 0.5 is "medium" and 0.8 is "large," even with our small sample of tribunals, we have enough power to detect "medium" size effects.

A.5 Figure Appendix

Figure 1, 2, and 3 show examples of the Quantum platform for the control, dashboard, and pop-up treatments.

A.6 Regression Appendix

The present Appendix contains regression results that complement those provided in the main text. We first provide the Intention to treat effects versions of the main results of the paper. Then we present an analysis of the impact of our interventions on the login behavior of the court managers.

A.6.1 Intention to Treat Effects and Local Average Treatment Effects

This section presents the intention to treat effects (ITT) associated with the local average treatment effects (LATE) from Section 5, Table 6 in the main text. For ease of comparison, Table 13 shows both the ITT and LATE estimates.

A.6.2 Quantum Access

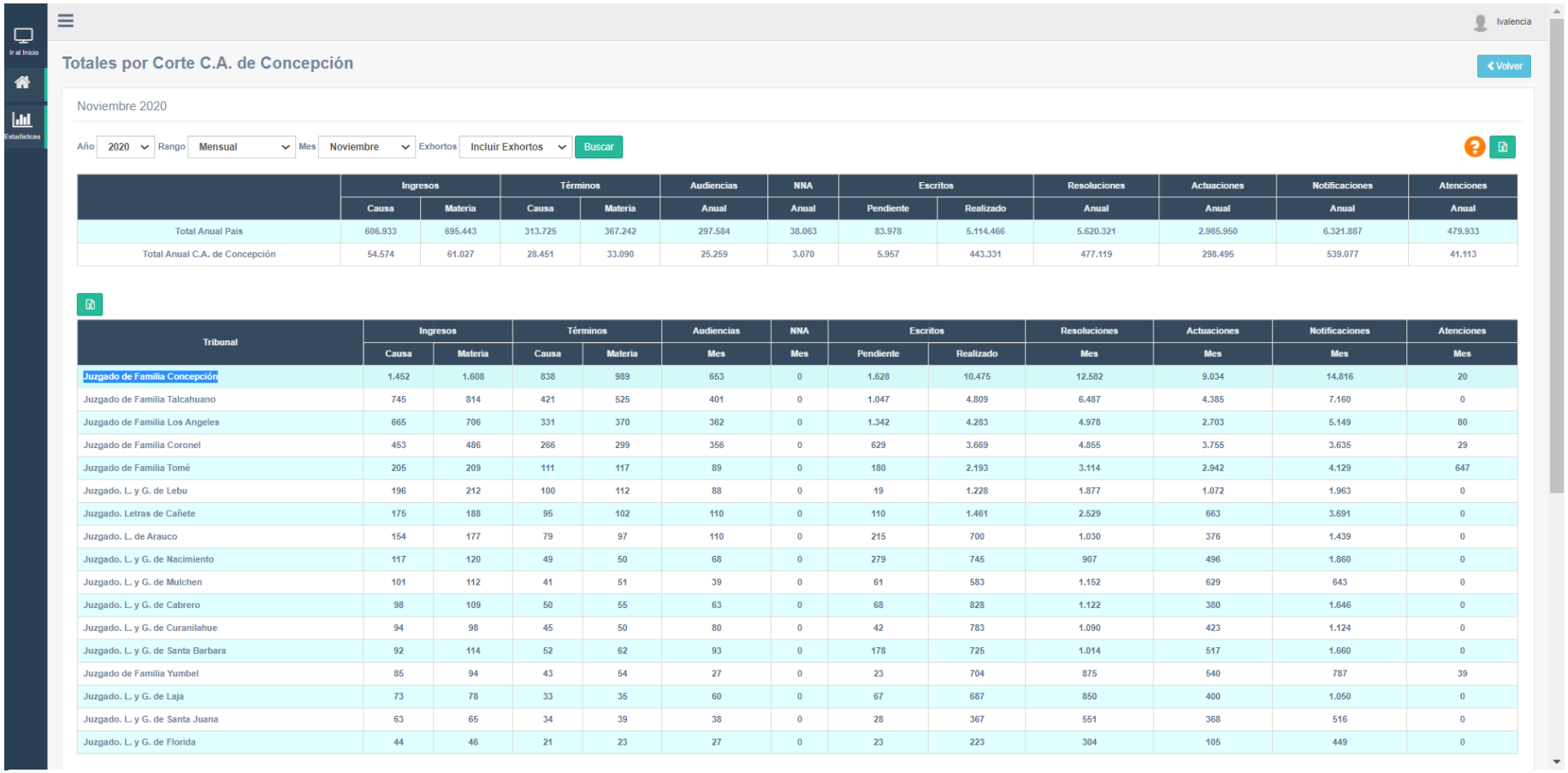
In this section, we evaluate the impact of the email promotion and feedback interventions on the managers' usage of Quantum. We consider the following specification:

$$y_{it} = \beta_0 + \beta_1 Email_i + \beta_2 \mathbf{X_i} + \beta_3 l_{it_0} + \beta_4 \gamma_t + \epsilon_{it}, \tag{3}$$

where y_{it} is the number of logins by court i in month $t \in$\{February, March, April, May, June\}; $\mathbf{X_i}$ is a vector of characteristics of court i, which includes the court's manager's sex, age, and tenure, and the stratified variable of a dummy for large courts computed using the 2019 number of incoming cases; l_{it_0} is a dummy indicating whether the manager logged at least once into Quantum in the pre-treatment month of January; and γ_t is a month fixed effect.

We can adapt (3) to a probit specification, in which the dependent variable is a dummy indicating whether the manager of court i logged at least once in month t. We

Figure 1: Old Quantum main homepage



	Ingresos		Términos		Audiencias	NNA	Escritos		Resoluciones	Actuaciones	Notificaciones	Atenciones
	Causa	Materia	Causa	Materia	Anual	Anual	Pendiente	Realizado	Anual	Anual	Anual	Anual
Total Anual Pais	606.933	695.443	313.725	367.242	297.584	38.063	83.978	5.114.466	5.620.321	2.985.950	6.321.887	479.933
Total Anual C.A. de Concepción	54.574	61.027	28.451	33.090	25.259	3.070	5.957	443.331	477.119	298.495	539.077	41.113

Tribunal	Ingresos		Términos		Audiencias	NNA	Escritos		Resoluciones	Actuaciones	Notificaciones	Atenciones
	Causa	Materia	Causa	Materia	Mes	Mes	Pendiente	Realizado	Mes	Mes	Mes	Mes
Juzgado de Familia Concepción	1.452	1.608	838	989	653	0	1.628	10.475	12.582	9.034	14.816	20
Juzgado de Familia Talcahuano	745	814	421	525	401	0	1.047	4.809	6.487	4.385	7.160	0
Juzgado de Familia Los Angeles	665	706	331	370	362	0	1.342	4.283	4.978	2.703	5.149	80
Juzgado de Familia Coronel	453	486	266	299	356	0	629	3.669	4.855	3.755	3.635	29
Juzgado de Familia Tomé	205	209	111	117	89	0	180	2.193	3.114	2.942	4.129	647
Juzgado. L. y G. de Lebu	196	212	100	112	88	0	19	1.228	1.877	1.072	1.963	0
Juzgado. Letras de Cañete	175	188	95	102	110	0	110	1.461	2.529	663	3.691	0
Juzgado. L. de Arauco	154	177	79	97	110	0	215	700	1.030	376	1.439	0
Juzgado. L. y G. de Nacimiento	117	120	49	50	68	0	279	745	907	496	1.860	0
Juzgado. L. y G. de Mulchen	101	112	41	51	39	0	61	583	1.152	629	643	0
Juzgado. L. y G. de Cabrero	98	109	50	55	63	0	68	828	1.122	380	1.646	0
Juzgado. L. y G. de Curanilahue	94	98	45	50	80	0	42	783	1.090	423	1.124	0
Juzgado. L. y G. de Santa Barbara	92	114	52	62	93	0	178	725	1.014	517	1.660	0
Juzgado de Familia Yumbel	85	94	43	54	27	0	23	704	875	540	787	39
Juzgado. L. y G. de Laja	73	78	33	35	60	0	67	687	850	400	1.050	0
Juzgado. L. y G. de Santa Juana	63	65	34	39	38	0	28	367	551	368	516	0
Juzgado. L. y G. de Florida	44	46	21	23	27	0	23	223	304	105	449	0

Figure 2: New simplified homepage

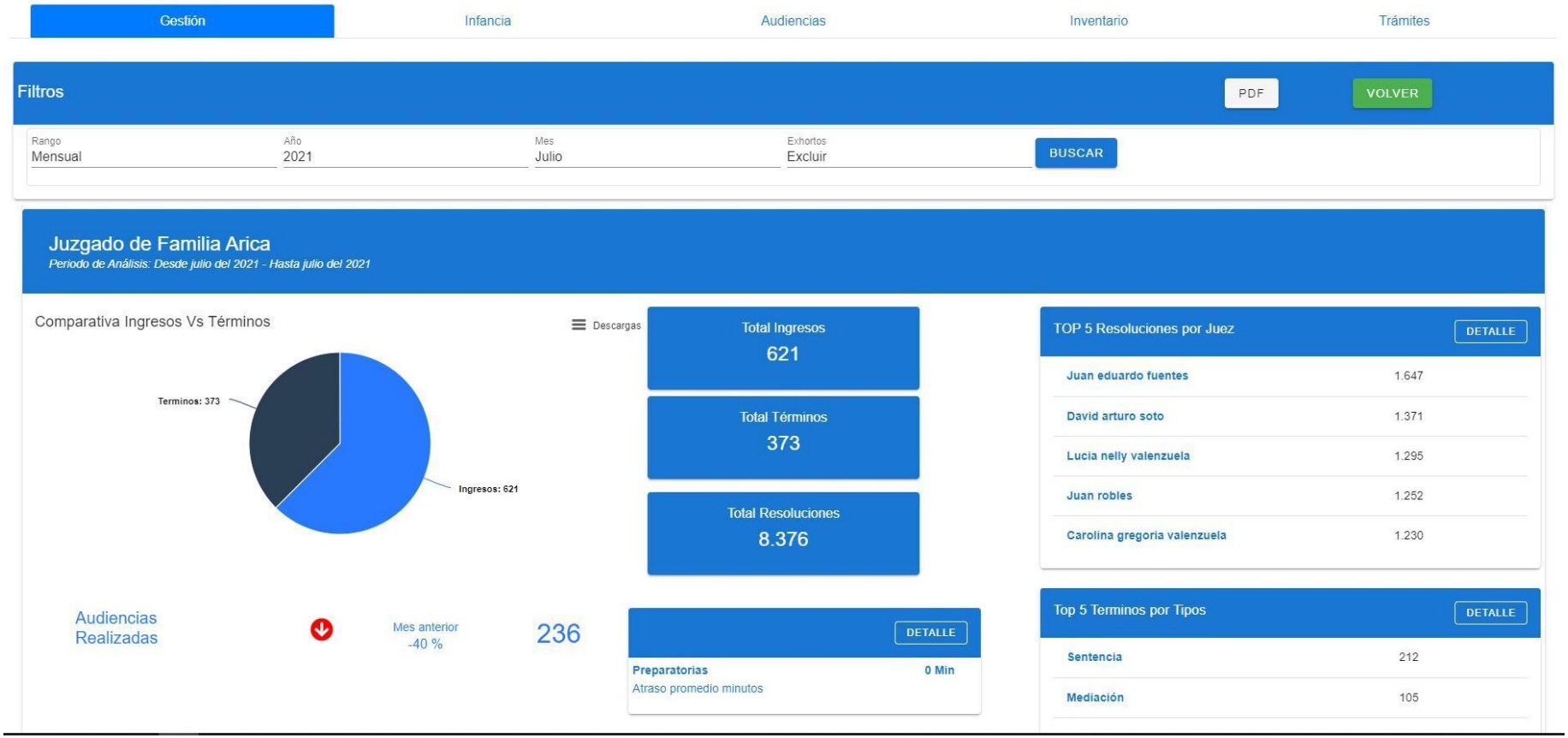


Figure 3: Pop-up window with social comparison

Table 13: Intention to Treat Effects (ITT) and Local Average Treatment Effects (LATE)

	Case Clearance		Timely Motion Resolution		Realized Hearings	
	ITT	LATE	ITT	LATE	ITT	LATE
	(1)	(2)	(3)	(4)	(5)	(6)
Email promotion	0.199	0.0924	0.0522	0.0104	-0.368***	-0.284***
	(0.144)	(0.145)	(0.0332)	(0.0378)	(0.0904)	(0.0957)
Simplified feedback	0.363**	0.912**	0.101**	0.266**	-0.251**	-0.525*
	(0.158)	(0.455)	(0.0458)	(0.109)	(0.126)	(0.315)
Social comparison feedback	0.131	0.500	0.0989***	0.344**	-0.373***	-1.055**
	(0.163)	(0.621)	(0.0380)	(0.134)	(0.137)	(0.471)
	Timely Case Resolution		Timely Hearing Programming			
	ITT	LATE	ITT	LATE		
	(1)	(2)	(3)	(4)		
Email promotion	0.0744**	0.0684*	-0.0362	-0.0823		
	(0.0332)	(0.0389)	(0.0564)	(0.0665)		
Simplified feedback	0.0285	0.0675	0.254***	0.758***		
	(0.0408)	(0.101)	(0.0685)	(0.266)		
Social comparison feedback	0.00339	0.00826	0.0137	0.0626		
	(0.0491)	(0.140)	(0.0796)	(0.303)		

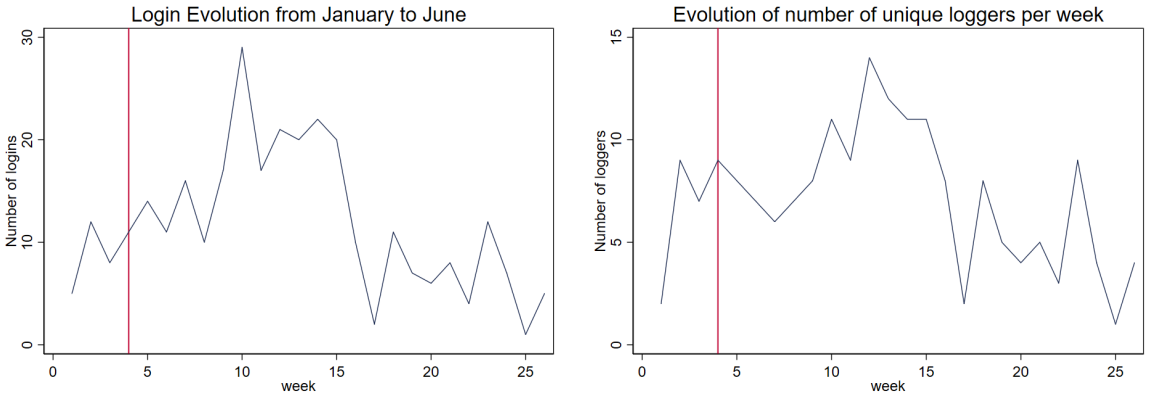
All regressions have as covariates the strata variable, three administrator characteristics, four pre-treatment lagged values of the dependent variable and number of hearings, pre-treatment login dummy, and month fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

can also substitute indicators of our other treatments for $Email_i$ in the specification, to assess whether the simplified or social comparison feedback treatments impacted Quantum usage.

During the intervention, from January 26, 2021 to June 30 2021, the volume of logins seems to follow a seasonality pattern. Figure 4 shows the logins per week for the 50 courts in our intervention, beginning in January 1. In the figure, the vertical line shows the beginning of the treatment. The weeks following the intervention saw a general upward trend in the number of logins, peaking on week 10 (March 8-14), and then a downward trend. We see a similar pattern if we measure login activity as the number of court managers who logged in at least once in the week—although the peak in this series happens somewhat later, on week 12.

In the first part of Table 14, we explore the impact of the email promotion on Quantum logins through two distinct econometric models: random effects (columns 1) and random-effects probit (columns 2 and 3). All specifications show a positive effect of email promotion on logins but with noisy estimates. The random-effects regression in column (1) suggests that the email promotion caused the number of logins per month in a court to increase by 0.3 logins compared to those that did not receive the email promotion. The average number of logins over the 49 family courts was approximately 1.1 logins per month; thus, the relative impact of the email promotion is large. The estimates for simplified and social comparison feedback have smaller magnitudes and

Figure 4: Evolution of Quantum Logins and Loggers



A) Number of logins B) Unique loggers

Red x-line at week 4 marks the beginning of the intervention

even large standard errors. Thus, we cannot conclude that either had any differential impact on the number of logins. Moreover, the results indicate that more experienced managers log into Quantum less than their less experienced colleagues.

The results for the random effects probit in columns (2) and (3) provide similar evidence of an increase in logins for the email promotion but, again, not statistically significant. We find that the email promotion makes the likelihood of login into Quantum at least once in a month increase by 5% with respect to those that did not get the email promotion. Moreover, the results indicate that more experienced managers log into Quantum 14 percent less than their less experienced colleagues. To further explore the impacts of the feedback and email promotions, the third column of Table 14 shows results of specifications that include the treatments interacted with a dummy for high-experience managers. All estimates in column (3) are imprecise.

To summarize, Table 14 shows suggestive evidence that the email promotion increased the monthly number of logins and no evidence that the simplified and social comparison feedback changed the number of logins or users in Quantum.

Table 14: The Intention to Treat Effects of Email and Feedback on Quantum Logins

	Random-effects		
			probit
	Number of logins per month	At least one login per month	
	(1)	(2)	(3)
Email	0.353	0.0963	0.0473
	(0.225)	(0.0701)	(0.166)
Simple Feedback	-0.176	0.0133	0.127
	(0.277)	(0.0973)	(0.199)
Social Comp. Feedback	-0.0734	-0.102	0.00921
	(0.291)	(0.0917)	(0.141)
High Experience	-1.013***	-0.140*	-0.0724
	(0.271)	(0.0778)	(0.149)
Email Promotion x High experience			0.0608
			(0.187)
Simple Feedback x High Experience			-0.157
			(0.221)
Social Comp. Feedback x High Experience			-0.155
			(0.176)
N	245	245	245
DV Mean	1.07	0.35	0.35
Strata	✓	✓	✓
Month FE	✓	✓	✓
Admin. Characteristics	✓	✓	✓
Pre-treatment Login	✓	✓	✓

RE Probit shows the average marginal effects. Administrator controls include male dummy, age, number of years in the position, and the interaction of age and years in the position. Standard errors are bootstrapped.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$