DNC Registry: Policy evaluation

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Introduction

Technological advancement has allowed telemarketers to engage individuals on a scale that was not possible a few years ago. For example, software platforms and technologies can automate repetitive tasks, such as the sending of unsolicited promotions to many individuals at a time (Hui and Png, 2006)[1].

Numerous jurisdictions have implemented privacy laws to curb such unsolicited marketing. The primary way by which privacy legislation attempts to control unsolicited marketing is through a concealment mechanism – the Do-Not-Call (DNC) registry. Such registries allow individuals to register their telephone numbers to opt out of receiving marketing phone calls and text messages. In 2003, the U.S Federal Trade Commission established a "do not call" registry. Similarly, Australia enacted a "do not call" registry in 2007. Canada set up its registry in 2008. In 2012, the Parliament of Singapore passed the Personal Data Protection Act (PDPA). The PDPA provides for the establishment of a national DNC registry. The DNC registry came into force on 2 January 2014.

In this paper, we provide a quantitative measure of the DNC registry's effectiveness on firms' incentives to continue unsolicited marketing contrary to the provisions of the PDPA. We evaluate the impact of the registry through a randomized controlled trial (RCT). In the RCT, 101 students at the National University of Singapore (NUS) keep an online log of telemarketing calls and SMSes from December 2013 to June 2014. Students were randomly assigned to treatment groups (where students sign up with the DNC registry) and control groups (where students do not sign up with the DNC registry). Using a Difference-In-Difference analysis, we find empirical evidence that those who signed up with the DNC registry experienced a reduction in telemarketing. More surprisingly, we also find that those who did not sign up with the DNC registry also experienced less telemarketing, suggesting that telemarketers may have ceased business.

Motivation and Theory

The existing empirical literature seems to focus on the effect of certain events on DNC registration signups. For example, in Hui and Png (2014)[2], the authors used data provided by the U.S Federal Trade Commission (FTC) to examine the effect of providing a toll-line service for DNC sign-ups (as opposed to the sole provision of an online portal for DNC sign-ups) on DNC registrations. Similarly, Goh, Hui and Png (2011)[3] were able to use DNC registration data provided by the U.S FTC to examine the effect of newspaper reports on DNC registrations.

On the other hand, there is a distinct lack of empirical literature concerning the actual effects of the creation of DNC registries on unsolicited telemarketing. According to Hui and Png (2014)[4], "there has been relatively little analysis of how opt out mechanisms work in practice". There is, however, work that examines the effectiveness of regulatory policies on

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1 Hui, K. L., & Png, I. P. (2006). The economics of privacy. Handbooks in Information System and Economics, 1, 471-493.
2 Hui, K. L., Png, I. P. L., & Goh, K. Y. (2014). Privacy and Marketing Externalities: Evidence from Do Not Call. Management Science, forthcoming.
3 Goh, K. Y., Hui, K. L., & Png, I. P. (2011). Newspaper reports and consumer choice: Evidence from the Do Not Call Registry. Management Science, 57(9), 1640-1654.
4 Supra 2

privacy. For example, Jama et. al (2003)[5] find evidence that e-commerce vendors comply with their published privacy policies in the absence of government regulation, suggesting that privacy legislation may not be an end-all solution. In a similar paper, Jama et. al (2005)[6] compare and contrast EU and U.S privacy regimes in the e-commerce industry. The authors argue that mandatory regulation tends to drive out self-regulation. These works raise an important issue – how effective is privacy legislation in curbing unsolicited marketing?

Two strands of reasoning motivate this paper. Firstly, firms should have incentives to concentrate marketing efforts on consumers who do not sign up with DNC registries even in the absence of coercive punishments for non-compliance. This is because a DNC registry enables consumer self-selection, thus providing firms with information on the consumer's willingness-to-pay for the marketed goods. We call this the "self-selection effect".

Hann et. al (2006)[7] note that in an opt-in concealment scheme like a DNC registry, self-selection is enabled pursuant to the consumer's benefits from the marketed items or the harms they suffer from unsolicited marketing. Thus, under such a scheme, low benefit consumers choose to opt-in while high benefit consumers choose to opt-out. From the firm's (marketer's) perspective, solicitations act as a strategic complement to concealment by low benefit consumers (Bulow et. al, 1985[8]). Low benefit consumers are screened out by the concealment scheme, so the firm experiences greater returns from marketing to remaining high benefit consumers. This provides the firm with strong incentives to concentrate its marketing efforts on unregistered consumers. To the extent where some remaining unregistered consumers do not want to receive unsolicited marketing efforts[9], registered consumers impose an indirect externality on them. Using DNC registration data provided by the FTC, Hui and Png (2014)[10] show empirical evidence for this externality created by registered consumers on unregistered consumers. This implies that firms do indeed concentrate marketing on unregistered consumers in the presence of a DNC registry.

Secondly, firms should have incentives to concentrate marketing efforts on consumers who do not sign up with DNC registries simply because they face potential sanctions if they send unsolicited promotions to registered consumers. We call this the "sanction effect".

Literature led by the Law and Economics movement has long advocated that firms are sanction-optimising agents (Becker, 1968[11]). Sanction-optimising agents will pursue an illegal course of action if the expected punishment multiplied by the probability of enforcement (by the relevant authorities) is lower than the expected gain from that course of action. While the PDPA imposes sanctions on firms that continue to solicit consumers under the DNC registry, it is plausible to fathom the scenario where the expected gain from unsolicited

5 Jamal, K., Maier, M., & Sunder, S. (2003). Privacy in E-Commerce: Development of Reporting Standards, Disclosure, and Assurance Services in an Unregulated Market. Journal of Accounting Research, 41(2), 285-309.
6 Jamal, K., Maier, M., & Sunder, S. (2005). Enforced standards versus evolution by general acceptance: A comparative study of e-commerce privacy disclosure and practice in the United States and the United Kingdom. Journal of Accounting Research, 43(1), 73-96.
7 Hann, I. H., Hui, K. L., Lee, S. Y. T., & Png, I. P. (2008). Consumer privacy and marketing avoidance: A static model. Management Science, 54(6), 1094-1103.
8 Bulow, J. I., Geanakoplos, J. D., & Klemperer, P. D. (1985). Multimarket oligopoly: Strategic substitutes and complements. The Journal of Political Economy, 488-511.
9 Screening is imperfect – there are some low benefit consumers who do not self-select by opting-in.
10 Supra 2
11 Becker, G. S. (1974). Crime and punishment: An economic approach. In Essays in the Economics of Crime and Punishment (pp. 1-54). UMI.

marketing is simply larger than the sanctions coupled with the probability of enforcement. If consumers are "not truly so sensitive about privacy" (Hui and Png, 2006[12]), then they may simply choose to brush off such breaches of the PDPA as minor inconveniences, rather than to report such breaches to the relevant authorities. This will effectively reduce the probability of enforcement against these breaches[13]. On the contrary, if consumers actively report breaches of the PDPA to the relevant authorities, or if sanctions have strong punitive repercussions, then firms will be disincentivised from pursuing unsolicited marketing.

In light of the aforementioned reasons, it is pertinent to provide a quantitative measure of the DNC registry's effectiveness on firms' incentives to continue unsolicited marketing contrary to the provisions of the PDPA.

Context and Data

In 2012, the Parliament of Singapore passed the PDPA. The PDPA provides for the establishment of a national DNC registry. The DNC registry started accepting consumer registrations from 2 December 2013 and came into force on 2 January 2014. Firms were allowed to create an account with the DNC registry from 2 December 2013 and were allowed to access the registry[14] from 2 January 2014.

We evaluate the impact of the registry through a randomized controlled trial (RCT). 120 students at the National University of Singapore (NUS) keep a daily online log of telemarketing calls and SMSes from December 2013 to June 2014. Prior to the date when the DNC registry came into effect (2 January 2014), we randomly assigned students into two groups. In the control group, students were instructed not to sign up with the DNC registry. In the treatment group, students were instructed to sign up with the DNC registry.

Empirical Strategy

Many factors other than privacy laws affect the incentives of firms to engage in unsolicited telemarketing. Hann et. al (2006)[15] note that "spam is not random but rather targeted". The authors note that spam was more prevalent amongst consumers who declared particular interests, and that there was an increased incidence of spam for accounts associated with persons who were more likely to purchase online. However, targets of unsolicited marketing may be inclined to sign up with a DNC registry to prevent further spam. For example, Varian et. al (2004)[16] provide evidence that high-income consumers (presumably targets of spam) are more likely to sign up with a DNC registry.

Thus, in order to measure the effect of the DNC registry on firms' incentives, it is not sufficient to observe changes in observed telemarketing for registered individuals. *T*hese individuals may have been subject to a higher rate of telemarketing prior to when the DNC registry came into force. Such a regression model would suffer from omitted variable bias.

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12 Supra 1
13 Infra 14
14 To procure a list of phone numbers for compliance with the provisions of the PDPA. Note that firms may have perverse incentives to procure phone numbers from the DNC registry to resell such information to third parties, or to engage in illegal, unsolicited marketing.
15 Hann, I. H., Hui, K. L., Lai, Y. L., Lee, S. Y. T., & Png, I. P. (2006). Who gets spammed?. Communications of the ACM, 49(10), 83-87.
16 Varian, H., Wallenberg, F., & Woroch, G. (2004). Who signed up for the do-not-call list?.

In a randomised controlled trial, randomisation of the assignment to the control or treatment group serves to ensure that members of the two groups do not differ systematically. However, even if people in the control and treatment group differ in some ways, we can still conduct meaningful analysis if the unobserved differences between them are the same over time. In our factual matrix, this seems to be a reasonable assumption – it is unlikely that factors affecting the incentives of firms to engage in unsolicited telemarketing to people in the control and treatment groups would change within six months.

Accordingly, our empirical model related daily SMS observations $texts_{it}$ with various binary variables as follows. We specified the dependent variable in logarithm to mitigate skewness in the distribution of ε_{it}:

$$\log(1 + texts_{it}) = \beta_1 Jan1after + \beta_2 Register + \beta_3 Register\_Jan1after + \varepsilon_{it}$$

where $Jan1after$ is binary variable which carries a value of 0 before 2 January 2014 and 1 after 2 January 2014, $Register$ is a binary variable which carries a value of 0 if the individual is assigned not to sign up for the DNC registry and 1 if the individual is assigned to sign up for the DNC registry, $Register\_Jan1after$ is an interaction term equivalent to $Jan1after * Register$, and ε_{it} represents idiosyncratic error.

The coefficient, β_3, is the difference-in-difference estimator, which provides an estimate of the treatment effect, which in this context is the effect of DNC registration on observed telemarketing.

The same procedure is repeated for daily telemarketing calls, using $calls_{it}$ instead of $texts_{it}$.

Results

To provide a first look of the data, Figure 1 depicts the average telemarketing texts received per day among those who did register with the DNC registry and those who did not. Evidently, following enforcement of the DNC registry on 1 January 2014, texts received fell for both groups – those who did and those who did not register. The drop was larger for those who did register.
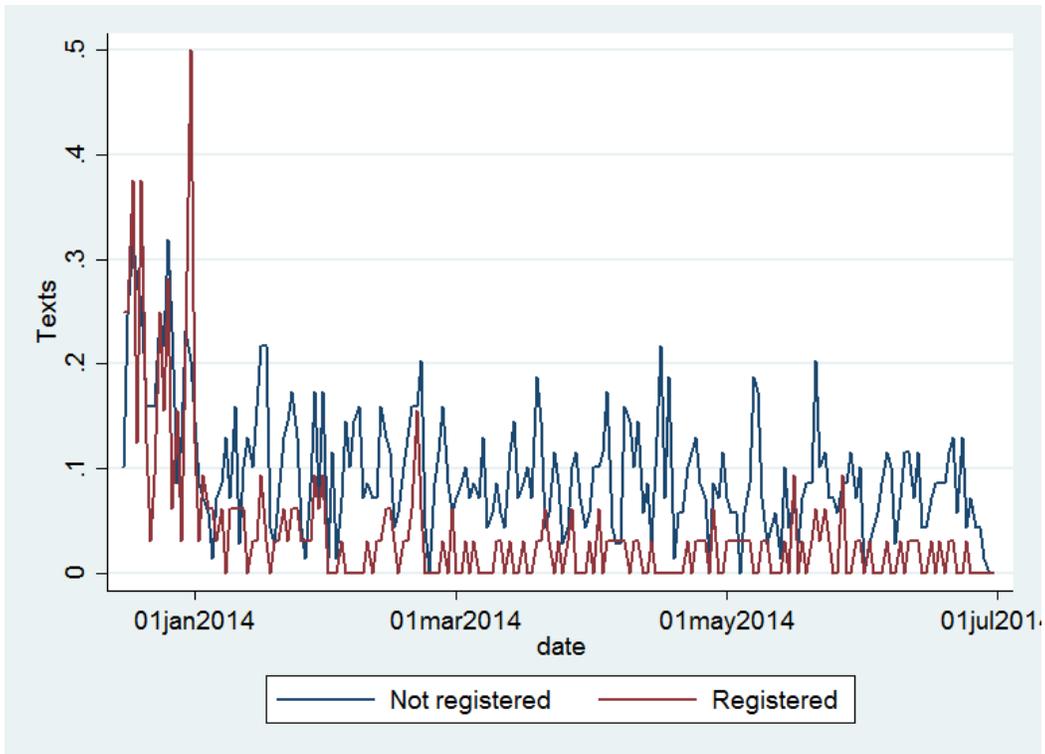
FIGURE 1: TELEMARKETING TEXTS
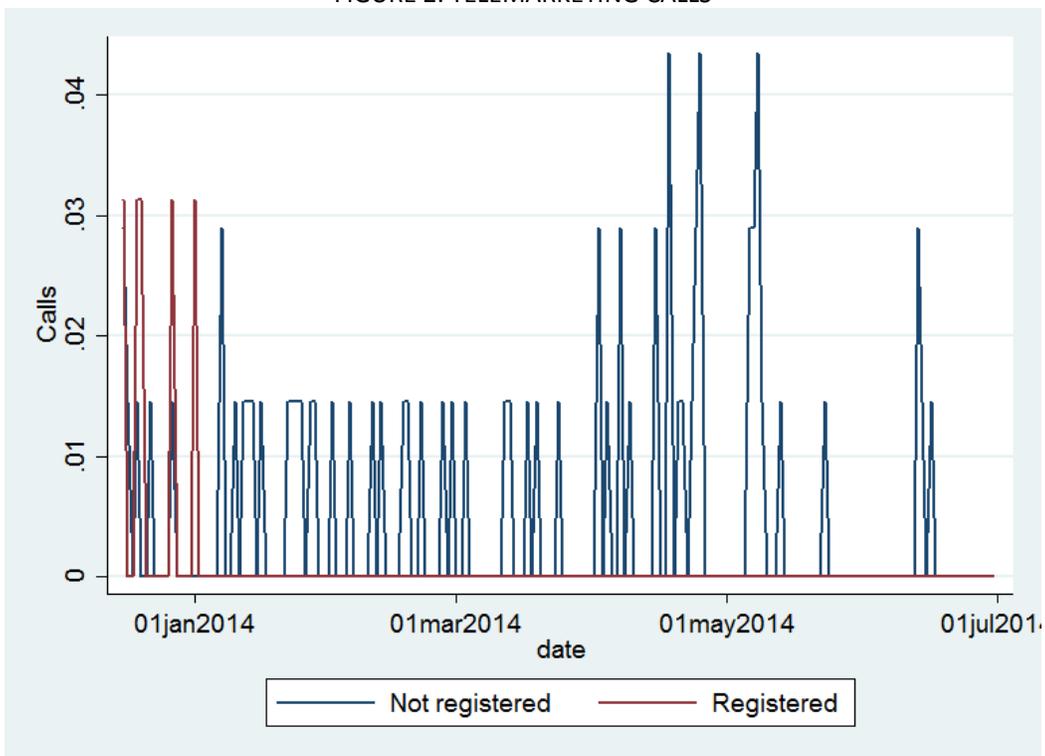
FIGURE 2: TELEMARKETING CALLS

Figure 2 depicts the pattern of telemarketing calls over time. Just as with texts, following enforcement of the DNC registry on 1 January 2014, both groups – those who did and those who did not register – experienced fewer calls with a larger drop for those who did register.

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To investigate more formally, Table 1, Columns (1) and (2), reports OLS (ordinary least squares regression) estimates for telemarketing texts received with the dependent variable being the logarithm of 1 + the number of daily texts.

TABLE 1: REGRESSION ESTIMATES

	(1) Text messages: Fixed effects	(2) Text messages: Random effects	(3) Calls: Fixed effects	(4) Calls: Random effects
Jan1after	-0.03264*** (0.009721)	-0.03264*** (0.009721)	-0.000117 (0.001369)	-0.000117 (0.001369)
Register	N.A	-0.004668 (0.02178)	N.A	0.001264 (0.002443)
Register_Jan1after	-0.03553* (0.01833)	-0.03553* (0.01833)	-0.004365* (0.002568)	-0.004365* (0.002568)
Constant	0.08789*** (0.007066)	0.08940*** (0.01065)	0.003746*** (0.0009924)	0.003337*** (0.0009784)
N	101	101	101	101
R^2	0.0109		0.0109	

The coefficient of $Register\_Jan1after$ is negative and statistically significant at the 10% level. These results align with our a priori hypothesis that consumers who sign up with the DNC registry would experience a reduction in telemarketing SMSes. The reasons for this reduction are possibly twofold. Firstly, the DNC registry acts as a screening mechanism to filter out low benefit consumers, so firms experience greater returns from marketing to the remaining unregistered, high benefit consumers. Secondly, firms face potential sanctions from providing unsolicited marketing to registered consumers, so they are disincentivised from engaging in such behavior. Unfortunately, there is no direct interpretation of the magnitude of the coefficient, as we specify our dependent variable as a log transformation of the number of text messages observed over the period of the study.

What is surprising and interesting is that the coefficient of $Jan1after$ is negative and statistically significant at the 1% level. This coefficient represents the effect of the DNC registry on all participants in the study, whether they registered or not. Apparently, all participants experienced an approximately 3% decrease in telemarketing texts after the DNC registry came into effect. The reduction in telemarketing on those who did not register cannot be explained by screening. The explanation is likely that the potential sanctions for unsolicited telemarketing caused telemarketers to stop telemarketing across the board, perhaps, ceasing business.

Table 1, Columns (3) and (4), reports OLS estimates for telemarketing calls received with the dependent variable being the logarithm of 1 + the number of daily calls. The coefficient of $Register\_Jan1after$ is negative and statistically significant at the 10% level.

The estimated treatment effects for telemarketing texts (in Table 1) are much larger than those for telemarketing calls (in Table 2). This is possibly for two reasons. Firstly, most of the study participants received no calls, and so, experienced little to no variation in their number of received calls throughout the entire duration of the study. Thus, the data

gathered from these individuals would not provide any information on the effect of the DNC registry on unsolicited marketing. Secondly, we note that the R^2 values in Table 2 are very low when compared to Table 1– the regressors explain very little of the variation in the data.

Limitations

Due to the lack of additional information, we were unable to distinguish the self-selection effect from the sanction effect. Firms only acquired access to the DNC registry on 2 January 2014, which also happened to be the date whereby the DNC registry came into force. Thus, firms would face incentives from both effects to reduce or refrain from unsolicited marketing to registered individuals from the same day. Future extensions to the project could involve the use of additional data to isolate the sanction effect. For example, newspaper reports on enforcement could increase the sanction effect for a period of time.

Furthermore, the sample size of the RCT is rather small, with the consequence that the treatment effect is not precisely estimated.

Conclusions

Our empirical results are consistent with the policy intent that consumers who sign up with the DNC registry would experience a reduction in telemarketing. Surprisingly, even those who did not register with the DNC registry experienced an approximately 3% decrease in telemarketing texts after the DNC registry came into effect. The reduction in telemarketing on those who did not register can be explained by telemarketers reducing telemarketing across the board, perhaps, ceasing business, which is an unintended consequence of the DNC registry.