Data Users versus Data Subjects: Are Consumers Willing to Pay for Property Rights to Personal Information?

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Abstract

Privacy advocates claim privacy violation is a social cost of the widespread trade in personal information driven by advances in information management technologies and the Internet. Data users claim that significant benefits from free information exchange are passed on to data subjects and that these benefits outweigh any potential privacy violations. A central issue in this ongoing debate is answering the question, "who owns and who controls personal information". Using the theory of property rights, we argue that personal information is a public good. We analyze responses from 459 New Zealanders to a contingent valuation survey to estimate the economic value data subject's place on a hypothetical change to data protection laws that gives data subject's an enforceable, property right in their personal information. The results are compared with other recent property rights studies to provide guidance for the use of opt-in versus opt-out legislative exclusion to protect information privacy.

1. Introduction

Answering the question, "who owns personal information", was cited as one of the four major ethical issues of the Information Age [1] in the mid- 1980's. Twenty years later, the debate between privacy advocates and data users continues as evidenced by the formation of advocacy groups on both sides, high consumer concerns in recent polls [2, 3], proposals for stronger privacy legislation [4] and reports of privacy violations in the media.

A growing stream of research within the larger body of work on the interactions between computers and society has emerged in response to growing ethical concerns about current practices with respect to the collection, uses and management of personal information using modern information technology.

The use of personal information for purposes other than those for which it was collected, the increased sharing between public and private organizations, collection without the data subject's consent, sharing without consent and improper access to sensitive data collections are key international concerns about the secondary market in personal information [5, 6]. These concerns are aspects of the broader issue of who should own (legal property right) and who should control (economic property right) personal information [7]. Given a legal property right of ownership, the existence of an economic right depends on the ability to benefit from use, exchange or existence of the good. That is, having a legal right is not a necessary and sufficient condition for having an economic right [7]. The ability to benefit from an economic right depends on the ability to enforce an economic right by preventing other claimants to that right from encroaching on that right. Under opt-in legislation, legal ownership and economic control favor data subjects, imposing greater costs on data users. In contrast, under opt-out legislation, an ownership interest is recognized for data subjects but control (i.e. economic rights) are held by data users since the bulk of the transaction costs of discovering who has information and what they are doing with it are imposed on data subjects. Deciding which policy is appropriate remains a difficult task. Privacy advocates favor opt-in legislation as the means of property rights allocation but what are the implications for enforcing this policy?

The aim of this research is to provide empirical evidence of the value New Zealand consumers would place on gaining stronger economic property rights, to their personal information. We argue that personal information is currently treated as a pure public good and that data users are the primary beneficiaries of collective economic rights to personal information due to the presence of asymmetric information and transaction costs. Contingent valuation was used as the method of assessing benefits as it was specifically designed to directly measure option price, the correct ex-ante measure of a hypothetical change in utility and to measure both use and non-use (or existence) benefits of a hypothetical change in the quality or quantity of a public good [8].

This study makes the following contributions: 1) it provides an estimate of the value data subject's would place on having economic property rights to their personal

information, 2) it provides input to cost/benefit analyses that treat personal information as a public good and 3) it compares the results to other existing efforts [9, 10, 11, 12, 13, 14, 15] that also take an alternative "property rights" approach to protecting or valuing privacy [15].

2. Theoretical Framework

According to Coase's Theorem [16], efficient bargaining can only occur if: 1) property rights are unambiguous, 2) full-information is available to all parties to avoid strategic behavior and 3) transaction costs for negotiation and enforcement are minimal. In the following sections we examine these three conditions with respect to the current market in personal information and examine current theory on property rights as a basis for asking the questions: What price do data subjects place on privacy protection in the form of economic property rights? What are the incentives for enforcing this economic right and who will pay for enforcement?

2.1. Personal Information is a Public Good

Personal information is intangible property since it is non-physical [17]. *Property rights* on intangible property refer to one's ability to control or restrict access to physical manifestations of one's personal information in the form of database records, web server records and mailing lists. The economic properties of rivalry and exclusion (Table 1) are useful in examining the nature of personal information and associated property rights.

Table 1. Rivalry, Exclusion & Property Rights

	Exclusion	No Exclusion
Rivalry	Pure Private Good	Quasi-public (common-access) Private Good
No Rivalry	Quasi-Private (club) Public Good	Pure Public Good
Property Rights	Individual Property Rights	Collective Property Rights

Since the use or possession of personal information by one party does not preclude its use or possession by others, personal information is non-rival, making it a public good. However, determining whether one can exclude others from using or sharing personal information once it is collected, is more problematic. Those who argue that information should be free and accessible to all, view it as non-excludable and non-rival. This is evidenced by the widespread free trade in the secondary market for personal information amongst public and private data users and the resulting ambiguous claims to unassigned economic property rights.

According to the theory of property rights proposed by Demsetz [18] and later expanded by [7, 19], a property right can be sub-divided into legal property rights (clearly assigned, protected and enforced by government) and economic property rights (ability to benefit from use, existence, consumption or exchange) with some economic rights protected by law and others subject to residual claims based on current convention. Legal rights imply ownership while economic rights imply "realizable" control. Having a legal right does not mean one has the means to exclude others from encroachment on their rights. Data users currently benefit from economic rights in the secondary market without always having legal rights [14]. There can be no economic right even with legal rights if exclusion (control) is not possible due to high transaction costs [7, 19]. We refer to the later case (no exclusion) as collective property rights and the ability to exclude as individual property rights in Table 1.

2.2. Asymmetric Information and Transaction Costs

Data users have more information about what is collected and how the information is used and shared than data subjects do. The high monitoring costs data subjects would need to incur to reduce this asymmetry have allowed for over-disclosure in the secondary market [20]. As a result, data subjects bear social costs including dealing with SPAM, purchasing and learning to use privacy enhancing technologies (PETS), identity theft, dealing with increased junk mail and telemarketing calls and price discrimination based on correct as well as erroneous profiles [21, 22].

The means of redress for data subjects who experience privacy violations can be a deterrent to reducing information asymmetry. In the US, data subjects must initiate expensive legal action in the courts but can only do so for certain types of personal information. In NZ, redress can be sought through less expensive means, for privacy violations dealing with any type of personally information, via the Office of the Privacy Commissioner. To date there have been few empirical studies on the costs and benefits of these different forms of privacy protection [21, 23].

We have argued that personal information is currently a pure public good with collective property rights and that data subjects do not have strong economic rights. Current levels of asymmetric information and positive externalities that favor data users exist in the secondary market. Data protection laws that would give data subjects greater control, may enable the enforcement of individual property rights and treat personal information as a quasi-private public good which may or may not be optimal in terms of economic efficiency but may provide desired existence benefits. Currently, exclusion is only possible at the point of collection and despite having legal rights, economic rights are ambiguously assigned.

2.3. Protecting Personal Information Privacy

The value of information privacy differs across cultures and across contexts of use within cultures [6, 24, 25]. As a legal and social concept, information privacy is not well defined. Government regulation is one approach to dealing with privacy violation but some claim it generates high monitoring and enforcement costs for both data subjects and data users [20, 23]. The framework established by the European Union (EU) is an example of omnibus privacy legislation based on fair information practices (FIP) that seeks to establish privacy as a basic human right. Such legislation has a strong opt-in bias, allocating legal property rights to data subjects by requiring consent and notice before data collection, sharing and usage. This legislation aims to reduce information asymmetry but empirical evidence of the costs or perceived benefits of this form of protection are scarce.

New Zealand (NZ) has adopted a less stringent regulatory model relative to the EU. In 2002, the Office of the Privacy Commissioner handled 96.5% of all complaints with total expenses of NZD 2.2 million (USD 1.5 million) for a population of about 3.8 million. These figures imply this model is a fairly efficient and effective means of monitoring and resolving privacy problems [26]. The NZ Privacy Act of 1993, sets forth twelve principles to deal with the collection and handling of all personal information, by both public and private organizations. The NZ context is interesting as it currently provides an effective middle ground between the self-regulatory, sector specific environment of the US and the omnibus legislation of the EU, both of which are proving to be costly to implement [23].

A market-based alternative is the reallocation of property rights to the party that can amend the situation with the smallest transaction costs in terms of negotiating and entering into a contract for beneficial exchange [20, 27]. However, it is currently difficult for data subjects to contract with data users beyond collection of their personal information [20]. Web site privacy policies are an attempt at providing contracts but they only address online data, provide no real legal guarantees and ignore the more valuable information exchanges between data users in the secondary market [5]. To date, the difficulty of making and enforcing contracts along with information asymmetry have proven to be significant impediments to pure, market-based enforcement of economic property rights. Due to the high costs imposed on data subjects to monitor and seek redress, data users remain the least cost avoiders and retain the bulk of economic property rights with respect to collections of personal information.

Privacy advocates call for opt-in legislation but where do the incentives lie to enforce these legal rights for data subjects? By imposing higher costs on data users, opt-in can lower the value of personal information and decrease sharing and consequently the potential for privacy violation. Data users would have no incentive to enforce so government would have to do so by offering subsidies to data users or by taxing data subjects in order to pay for the costs of enforcement. Are data subjects who claim to value privacy highly willing to pay to protect it?

3. Method: Contingent-Valuation

The full benefits of protecting privacy have not been thoroughly studied and yet strong regulation such as the EU data directives have had a significant impact on global transactions, on the implementation of stronger regulatory models in Europe and on calls for stronger regulation in the US [4, 23, 28, 29]. Estimates of costs and benefits are needed to determine the viability of different forms of privacy protection. Behavior-based methods (see Table 2) for measuring the benefits of public goods differ with respect to the types of benefits they measure, data needs, and assumptions about agents and the environment [8].

Table 2. Behavior-based Methods

Properties	Observed Direct	Observed Indirect	Hypoth. Indirect	Hypoth. Direct
	Referenda	Travel Cost	Conjoint Analysis	Contingent Valuation
Option Price*	No	No	Yes	Yes
Value New Goods	Yes	No	Yes	Yes
Existence Benefits	Yes	No	Yes	Yes
Direct Est. Ordinary Demand	Yes	No	No	Yes
Direct Est. Compen. Demand	No	No	No	Yes

* - with uncertainty, this is the correct measure of a change in utility

Methods dealing with *observed* market behavior measure *ex-post* expected consumer surplus. Methods dealing with responses to *hypothetical* markets measure *ex-ante* option price under uncertainty, the correct measure since expected utility may differ from realized utility [8]. Hypothetical/Direct methods, like CVM, can be used to directly measure points on an individual's compensated demand curve, avoiding potential bias due to a researcher's assumptions about trade-offs by allowing the respondent to make their own trade-off in terms of money [30]. Privacy is considered by many to be an important aspect of quality of life and CVM while seen as controversial to some (cited in [31]), has been widely used in the US in economic studies of quality of life issues, especially in environmental and health-care studies. The use of CVM increased substantially after it

was endorsed in 1993 by the NOAA panel chaired by noble laureates, Arrow and Solow [32].

Therefore the use of CVM in this study was motivated by three factors: 1) a true market for buying/selling personal information where property rights are well-defined is not observable, so 2) we need to measure the ex-ante utility change as an option price via a hypothetical market and 3) we need to measure both the use and existence value of privacy as the later has implications for policy and the preservation of privacy for future generations and 4) we want to allow data subject's to make their own trade-offs to avoid bias from an incorrectly specified utility function.

CVM studies ask respondents directly what they are willing to pay (WTP) to maintain or increase the level, quantity or quality of a good or service taking their budget constraints into consideration. The WTP question used in this study is given in Figure 1.

> Taking into account your personal budget constraints, would you be willing to pay «$T» per year in higher taxes to enforce stronger data protection laws in New Zealand that would treat personal data as your private property so that it could not be collected without your consent, could not be used for purposes other than those for which it was collected without your consent and would give you the right to a portion of any income generated from its use (e.g. marketing mailing lists) should you choose to disclose it? **(Yes or No)**

Fig. 1. Dichotomous Choice Question

CVM and other direct methods assume respondents give more meaningful answers to direct questions whereas indirect methods such as Travel Cost and Contingent Analysis assume responses to related behavior questions are more meaningful. [8]. CVM studies can use any of a number of payment elicitation models including bidding games, payment cards, and binary choice. In the case of public goods, the binary choice (referendum) payment model is preferred since it does not assume people always express pre-existing preferences as with private goods. Instead, it assumes choices are influenced by multiple motives, contextual factors and less than perfect information [8].

3.1. Binary Choice Payment Elicitation Model

Following the seminal work of [33] and the recommendations of [32], there has been a shift to using the binary choice payment elicitation model in CVM studies as it provides incentives for truthful revelation of preferences and simplifies the cognitive task of respondents in making a choice [31]. The discrete choice (yes/no) format is most similar to a consumer making a choice to purchase or not purchase a good at its given price or to voting yes or no on a referendum. The format of our question follows recommended practice [8] by stating a need to consider budget constraints, payment mechanism and the nature of the change in the hypothetical market (see Figure 1). The approach of [34] based on utility maximization for a binary-choice model was used to estimate mean WTP. The utility the nth consumer gains by saying "yes", U_{in} , or "no" , U_{jn} , respectively to the question in Figure 1 is:

$$U_{in} = V_{in} + e_{in} = v(1, I_n - T_n, S_n) + e_{in} \quad (1)$$

$$U_{jn} = V_{jn} + e_{jn} = v(0, I_n, S_n) + e_{jn} \quad (2)$$

where V_{in} , V_{jn} are assumed to be non-random aspects of the utilities and e_{in}, e_{jn} are random error aspects of the utilities. S_n is a vector of observable attributes (see table 3) of the nth consumer that may affect their choice. T_n is the tax payment of $T that the nth consumer was given as the amount they would be required to pay for the change in utility given in Figure 1. I_n represents the data subject's income or utility of all other goods, assuming it is all spent at equilibrium. Given these conditions, the probability of saying yes $P_n(i)$ or no $P_n(j)$ respectively are:

$$\begin{aligned} P_n(i) &= Pr(U_{in} \geq U_{jn}) \quad (3)\\ &= Pr(V_{in} + e_{in} \geq V_{jn} + e_{jn}) \\ &= Pr(e_{jn} - e_{in} \leq v(1, I_n - T_n, S_n) - v(0, I_n, S_n)) \end{aligned}$$

$$P_n(j) = 1 - P_n(i) \quad (4)$$

Therefore, assuming that $e_n = e_{jn} - e_{in}$ is logistically distributed [34], the probability that the nth consumer says yes can be written as a binary logit model:

$$\begin{aligned} P_n(i) &= (\exp^{\mu V_{in}}) / (\exp^{\mu V_{in}} + \exp^{\mu V_{jn}}) \quad (5)\\ &= 1 / (1 + \exp^{-\mu (V_{in} - V_{jn})}) \end{aligned}$$

3.2. Maximum Likelihood Estimation of WTP

Using indicator variables, $y_{jn} = 1$, *and* $y_{jn} = 0$, to represent the nth customer saying yes or no respectively, the log likelihood function of the binary choice model can be expressed as:

$$L(\beta_1, \beta_2, \ldots \beta_k) = \Sigma(y_{in} \log P_n(i) + y_{jn} \log P_n(j)) \quad (6)$$

Maximum likelihood estimation using the binary logit procedure in SPSS 12.0 was used to input a k-vector, B of unknown parameters and to find an m-vector, X of significant parameters. The propensity to say yes, given tax payment, T_n, was estimated using the SPSS 12.0 probit procedure with a logit transform as:

$$P_n(i) = 1 / (1 + \exp^{-(\beta_1 + \beta_2 T_n)}) \quad (7)$$

where β_1 is the Intercept and β_2 is the coefficient of the tax payment. The mean WTP = $\beta_1 / | \beta_2 |$. Alternatively,

the mean can be computed using only positive values as a restricted mean WTP = $(1 / |\beta_2|) \ln(1 + e^{\beta_1})$ but this may overestimate the true WTP [35]. Both the unrestricted and restricted mean WTP figures were computed.

3.3. Sample and Data Collection Procedures

The survey was mailed to a random sample of 2000 New Zealanders in October 2002. The sample was drawn from the electoral roll, which represents 94.7% of New Zealanders aged 18 or older. Eighty-five surveys were undeliverable and 476 surveys were returned resulting in a 25% response rate, with 459 surveys complete and usable. A cover letter explained the purpose of the survey, defined personal information as personally identifiable information, and explained confidentiality and potential benefits to recipients. The questionnaire was pilot tested with a convenience sample representing a range of education, age and income levels.

Table 3. Sample versus NZ Population Demographics from 2001 Census

Variable	Description	Sample Frequency	Population Frequency
Age Group	1=18-27 yrs	10%	16%
	2=28-37 yrs	16%	20%
	3=38-52 yrs	32%	30%
	4=53-62 yrs	19%	15%
	5=63 yrs +	23%	19%
Gender	0=Male	46%	49%
	1=Female	54%	51%
Income	1=< NZD 30K	32%	32%
	2=NZD 30-$60K	34%	25%
	3= > NZD 60K	28%	24%
	4= Not Stated	6%	19%
Internet User	0 = Used Internet	66%	37% - access
	1 = Never Used Internet	34%	63% - no access
Education	0=No College	74%	87.5%
	1=College	26%	12.5%
Unemployed	0 = In workforce	68%	60%
	1 = Not in workforce	32%	40%

Unlike previous related studies, which used business students in the US and Singapore [9, 13, 36] or higher Internet-experienced, higher income US consumers [10], the sample in this study is fairly representative of the general population and is taken from NZ, a country with a different regulatory and legal environment from the US and Singapore.

The survey instrument design followed recommended CVM procedures [8, 37]. Information on a hypothetical market for personal information was presented, current consumer understanding of personal information protection was determined and a WTP payment question was included (see Figure 1 and appendix).

Follow-up questions to the WTP question (see appendix) were used to identify respondents that said No because they objected to the payment mechanism (i.e. tax). Seventeen of the 459 respondents were considered to be "protest votes". These 17 responses were excluded as recommended [8] resulting in a sample size of 442 for estimating mean WTP.

A tax amount, ranging from NZD 5 to 160 in NZD 5 increments, was randomly assigned to each of the 2000 questionnaires. The range was based on the results of a pilot test and an examination of average household income and spending in New Zealand. The median annual income in New Zealand was NZD 18,500 in 2001 based on the 2001 Census results.

3.4. Data Analysis and Key Variables

Analysis procedures consisted of estimating the mean and median WTP, estimating the propensity to pay at each price group level (NZD 5-20, 20-40, 40-60, …140-160) and estimating the aggregate value the population places on the form of opt-in economic property rights specified.

A binary logistic regression with WTP as the dependent variable was used to estimate the impact of the following factors: tax payment, level of privacy concern (CFIP), regulatory model preference, perception of current level of protection, and perceived influence of property rights clarification on trust of public and private agencies. The regression controlled for age group, gender, education, Internet use, participation in the workforce and income level. A probit analysis with a logit transformation was run to predict the proportion of consumers WTP within each price (i.e. tax) group.

CFIP was measured by averaging the responses to 15 questions previously validated in [6, 38, 39]. CFIP is a composite measure of concern that includes four privacy dimensions: collection, secondary use, errors and improper access. The 5 models in [6] were used to determine regulatory preference. Two separate questions were used to assess the degree to which property rights clarification influenced consumer trust in private and in government organizations (see appendix).

4. Discussion of Results

The results of a probit analysis with WTP as the dependent variable and tax payment group as the independent variable are given in Figure 2. The decrease in the proportion of yes respondents (from 55% to 36%) as the tax payment increased is consistent with theory. Theoretically, the proportion that are WTP will approach 100% as the tax payment approaches zero and will approach 0% as the tax payment becomes larger.

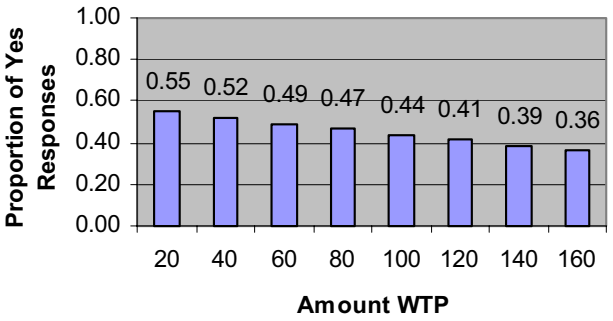

Fig. 2. Propensity to pay decreases with increasing price

A slim majority, 52.5%, said no to the WTP question. A belief or lack of belief in the effectiveness of data protection laws in decreasing misuse was the major factor in saying yes (45.7%) or no (37.5%) respectively. This provides evidence that most focused on the value of stronger laws rather than other factors when answering the WTP question and is consistent with the majority favoring stronger regulation and a majority perception that current protections in NZ are too low. Other reasons for saying no were not having enough money (20.7%) and not trusting the government to use the tax money for data protection (22%). None of the "No" respondents specified they were not WTP because privacy is a human right, but were given the option to specify other and explain their reasons (see appendix). These responses were interpreted as additional influences on a "No" vote as per [8], and were retained.

The other major reason for saying yes was a belief that the Internet and databases lead to greater misuse (30.0%). This could be interpreted as evidence being WTP for the existence value of privacy.

The probit analysis produced an Intercept = .30233 and a price coefficient= -.00546 which were used to calculate a data subject's median WTP, unrestricted mean WTP and restricted mean WTP. Aggregate values for the population are also shown in Table 4 and were calculated based on [34, 35] as discussed below.

The percent of yes respondents in the sample was applied to the population of 2,659,755 New Zealanders aged 18 to 82 (NZ Census, 2001) producing an estimate of 1,263,384. This was multiplied by the mean and by the median WTP to compute aggregates. In comparison, the total expense of running the Office of the Privacy Commissioner was NZD 2.2 million in 2001, much less than what nearly half of the respondents indicated they were willing to pay (NZD 70-74 million).

Table 4. Mean and median WTP calculations (in New Zealand Dollars, NZD)

Median WTP	NZD 58.7	USD 29.9
Aggregate WTP	NZD 74.0 M	USD 15.3 M
Unrestricted Mean WTP = Intercept/|Price Coefficient|	NZD 55.4	USD 28.3
95% Confidence Interval	[-37.4, 93.2]	
Aggregate Unrestricted WTP	NZD 70 M	USD 35.7 M
Restricted Mean WTP = (1/|Price Coefficient|)*ln $(1+e^{Intecept})$	NZD 156.7	USD 79.9
Aggregate Restricted WTP	NZD 198 M	USD 101 M

Interestingly 52.5% were not WTP, even though they expressed high CFIP (mean=4.20 on scale of 1 to 5, with 5 = very concerned). The slim margin of no votes over yes votes, would reduce by 11% if the respondents who stated their reason for voting "No" was "I don't have enough money" were excluded. These individuals could be considered to be free riders who want to benefit from privacy without paying for it. The close vote and number who were undecided on their response to some questions may indicate a need for education on actual practices of data users as well as existing levels of protection in order to reduce current levels of asymmetric information.

Table 5. Significant Results of the Binary Logistic Regression

	ß	s.e.	Wald	Sig.	Exp(ß)	95.0% C.I. for EXP(ß) Lower	Upper
Current Protection is Low	.710	.275	6.651	.010	2.033	1.186	3.487
Price	-.015	.003	21.793	.000	.985	.979	.991
Trust Govt * Trust Priv	.101	.049	4.283	.039	1.106	1.005	1.216
Not an Internet User	-.819	.292	7.888	.005	.441	.249	.781
Regulatory Preference	.778	.144	29.255	.000	2.177	1.642	2.886
Constant	-2.99	.661	20.484	.000	.050		

Note: ß is the coefficient showing the direction of influence. Exp(ß) indicates magnitude of the effect.

In addition to the significant variables ($p < .05$) shown in Table 5, WTP (1=yes, 0=no) was regressed against the other demographic variables in table 3 and the level of privacy concern (average CFIP, 1 to 5 high). Consistent with economic theory, the probability of being WTP increased as the tax payment decreased (ß = -.015, exp(ß) = .985). That is, for a one-dollar decrease in tax, a consumer was .985 times more likely to say yes. The probability of saying yes was positively influenced by preference for regulation, trust in government

and private organizations based on property rights recognition (Trust Govt *Trust Private) and perception of low current levels of protection. The sizes of the effects of perception on low levels of protection and preference for regulation, were twice the size of the effect of trust on WTP, but the confidence interval on trust was narrower indicating greater certainty on the later factor consistent with previous work [5, 10, 40, 41]. There was no evidence of multicollinearity amongst the independent variables but a significant constant term indicates there are other factors that influence WTP, one of which may be the existence value of privacy.

Including the significant predictors, the probability that the nth person says yes to the WTP question is:

$$P_n(\text{Yes}) = 1/(1+ e^{-(ß_1 + ß_2 (\text{Price})_n + ß_3 (\text{RegPref})_n + ß_4 (\text{TrustGov} * \text{TrustPriv})_n + ß_5 (\text{LowInc})_n + ß_6 (\text{Internet})_n)} \quad (8)$$

Not being an Internet user had a smaller, negative influence on WTP. Since the sample underrepresented this group (see Table 3), the true effect of this variable may actually be larger in the population. This interpretation is consistent with theory on lack of trust in technology and evidence of greater fears of privacy violation when technology is involved. These feelings are often present in middle-aged and older adults [40], and 74% of this sample compared to 64% of the population studied were 38 years or older.

A recent survey study [10] of 243 experienced online purchasers used structural equation modeling to analyze responses, finding that privacy concerns negatively impact intent to use online personalization services and that valuing trust and personalization have smaller positive influences. A different composite measure of privacy concern which focused on collection and voluntary disclosure rather than on errors, secondary use and improper access was used in [10]. The composite measure consisted of the 3 categories of personal information defined by the FTC [42] (anonymous, personally unidentifiable and personally identifiable) plus revealing preferences in general. The use of a sample of experienced online purchasers and the focus on collection may bias the results of [10] in favor of participants trading-off privacy for personalization since they have already done so in the past. A similar sample bias holds for [9, 13] who used conjoint analysis to analyze responses from US and Singapore business students with online purchasing experience and/or Internet experience.

In contrast, our benefit measures also take potential online participants with less education, less income and less experience with the online environment into consideration. This was important in this study since we asked participants to value economic rights to personal information that would be enforced by a government agency whose operations are funded by tax dollars. Given the percentage of the NZ population with these characteristics, our findings are important to policy makers who need to take all segments of the population into consideration.

Our findings that the majority have high CFIP supports the Singapore findings of [9, 13] that improper access and secondary use are of greater concern than errors. Our more general sample shows some differences as well. Respondents who were between 18-27 years of age had significantly lower concerns (1 to 5 high, mean = 3.926, p=.003) than older respondents (mean = 4.171). Those who had used the Internet for 4 or more years had significantly lower concerns (mean = 3.973, p=.005) than those who had never used it or only used it for 1-3 years (mean = 4.123). Our study found that on average, New Zealanders were willing to pay NZD 55.40 (USD 28.25) for property rights to protect privacy. Our findings are similar to [9] who estimated that individuals in their US sample valued privacy at USD 30.49 to 44.62 while those in the Singapore sample valued it at USD10.45 to 26.93. Our findings help to verify the results of [9] with a more representative sample and in a different regulatory context. We used a direct measurement technique and a wider range of monetary trade-offs (NZD 5-160) whereas [9] used two levels: protection or no protection and an indirect measurement technique. Similar results using different methods in different contexts strengthen the findings of both studies.

5. Limitations, Reliability & Validity

The limitations of this study center on the limitations of the CVM method and survey studies in general, international differences in terms of defining and valuing privacy, and the point in time in which the study was conducted. The unobserved (true) willingness to pay differs from the observed willingness to pay value based on the level of systemic and random error. Random error affects reliability, while systemic error affects validity of the WTP measurement. Systemic error may arise from question misspecification, misunderstanding of the researcher's intent with respect to particular questions and from strategic behavior. Our use of the discrete-choice payment elicitation method and follow-up questions is likely to reduce the potential for strategic behavior (not doing what one says one will do) [8, 43].

Generalizing our results to other populations at other points in time must be done with caution. Privacy is a temporal, socially defined concept, valued differently by different cultural groups and in relation to proximity to significant environmental events. Price was inversely related to WTP and the signs of all regression coefficients were in the predicted direction, providing support for theoretical validity based on economic theory. Content

validity was enhanced by using questions from previous surveys and a pre-test. The use of a familiar payment vehicle (taxes) and a clear representation of the property right allocation in the payment question also increase the validity of this study [8].

Income was expected to be a significant predictor of WTP based on economic theory but was not significant here. The sign on the income coefficient however was positive as predicted by theory. One reason for this result may be that there is less income distribution in New Zealand than in the US where a majority of CVM studies have been conducted.

Reliability could have been improved by using test-retest methods but the cost of doing so was prohibitive. Reliability was adequate in this study as the psuedo-R^2 was .311 (R^2 > .15 recommended), a small number of variables (relative to sample size) were used in the regression, sampling was random and additional outliers were not removed to improve the psuedo-R^2 [8].

6. Conclusions

This study determined the economic value New Zealand consumer's place on stronger privacy law that clarifies property rights in personal information in favor of data subjects. While most expressed high CFIP, only 47.5% of those surveyed were WTP and on average placed an economic value of NZD 55.40 (USD 28.25) on this form of protection, in line with previous findings [9] although the later used hypothetical/indirect measurement while this study used hypothetical/direct measurement. This implies that a significant portion of the NZ population values opt-in protection, perhaps due to placing a high existence value on privacy and a lack of trust in organizations to enforce protections. 52.5% were not WTP. These respondents could be considered free riders but further work that explores other forms of protection is needed to support this conclusion.

WTP was influenced by perceptions of current levels of protection, belief in property rights as a mechanism to improve trust, preferences for government regulation and lack of experience with the Internet. Preferences for strong government regulation of privacy and perceptions of current protections being too low had the strongest influences on saying yes. NZ consumers appear to have greater trust in government protection of economic property rights than in self-regulation (see appendix). Current NZ law, like US common law, grants a legal privacy right, viewing privacy as a human right. It has been used as a symbol by policy makers to frame legal (ownership) rights on all types of personal data (e.g. NZ Privacy Act of 1993) with a stronger opt-in flavor as compared to the greater predominance of opt-out and sector specific legislation in the United States where privacy pragmatists prevail [3].

One interpretation is that privacy legislation may play a largely symbolic role [44] whether it is opt-in or opt-out. The near-even split between yes and no votes to the proposed clarification of property rights might be explained as a reaction to a political symbol that matched the values of some (yes votes) but did not match the values held by others (no votes). The interpretation of the political symbol of "property rights in personal information" in this study may have been influenced by individual values acquired early in life as well as beliefs about the current structural context (e.g. current levels of protection). Policy makers in different countries may be using different political symbols in the form of different mechanisms for privacy protection based on the predominant way those symbols are likely to be interpreted by the public in order to reinforce current political predispositions towards levels of acceptable government regulation [44].

One-fourth of the data subjects surveyed were undecided about how property rights clarification would influence the trust they placed in public and private data users and 73% did not know what the current regulatory model was in New Zealand. The majority were unaware of existing privacy law, and may be uncertain of the value of their personal information providing evidence of asymmetric information which could be addressed through education, one of the roles of the Office of the Privacy Commissioner in NZ.

Demographic factors, excepting Internet usage, had no significant effects on WTP. Non-Internet users may perceive a greater need for online protection due to fears associated with technology but may not feel it was something they as non-users should pay for. In looking at the results as a referendum, a slim majority voted no to a reassignment of property rights to data subjects. Further work is needed to investigate other factors that might influence WTP for this as well as other means of protecting property rights in personal information.

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Appendix

Frequency Distribution for Trust Questions

	1	2	3
TrustGov: If my property rights to personal data were recognized through stronger privacy laws, I would have greater trust in *government agencies* that have collected this data.	10.5%	24.2%	65.4%
TrustPriv: If my property rights to personal data were recognized through stronger privacy laws, I would have greater trust in *private organizations* that have collected this data.	14.2%	24.2%	61.6%

Note: TrustGov and TrustPriv were recoded as 1= not effective, 2=undecided, 3=effective for the regression procedure.

Results of 15 Questions from [38] on CFIP (Concern for Information Privacy) Level

On a scale of 1 to 5 high, mean level of CFIP was 4.20 (median = 4.27). Collection (mean=3.79), Errors (mean=4.13), Access (mean=4.66) and secondary use (mean = 4.20).

Frequency Distributions for Regulatory Preference and Perception of Current Level of Protection Questions

RegPref: Regulatory Preference	%	**CurrLevel**: Do you think the current level of personal data protection in New Zealand is:	%
1=No Policy/Self-Help	1.1	1=too low	59.7
2=Company Self-Regulation	8.4	2=about right	27.7
3=Indifferent, Don't Know	28.7	3=too high	4.1
4=Data Commissioner	28.3	4=don't know	8.5
5=Registration or Licensing	33.5		

Note: The 5 models shown here were also used to ask participants what they thought New Zealand's current regulatory model was.

Frequency of Explanations for Answering No to the WTP Payment Question

If you answered NO to question 35, which one of the following best represents why you said no?	N=248	N=232
1=I don't think data protection is really needed	6.9%	7.3%
2=I don't have enough money	19.4%	20.7%
3=I don't think the money would be used for data protection	21.0%	22.4%
4=I don't like these kinds of questions	6.9%	7.3%
5=I don't think stronger data protection laws will decrease misuse of personal data	35.9%	38.5%
6=Other	10%	3.8%

Note: Sixteen "no" respondents wrote in "already pay too much tax" under other.

Frequency of Explanations for Answering Yes to the WTP Payment Question

*If you answered **YES** to question 35,* what is your main reason for supporting legal clarification of your property rights with respect to the collection and use of your personal data?	N=211	N=210
1=I do not feel self-regulation provides adequate protection.	14.4%	14.8%
2=I think the Internet and databases lead to greater misuse of personal data.	31.0%	30.0%
3=I think stronger data protection laws will decrease misuse of personal data.	44.4%	45.7%
4=I have experienced problems with personal data and have not been satisfied with current levels of protection.	6.5%	6.2%
5=Other	3.7%	3.4%

Note: One "yes" respondent wrote in "this survey is an example" and chose 4 above.