

Document Title: Evaluability Assessment of Pawnbroker Databases

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Evaluability Assessment of Pawnbroker Databases

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NIJ Guidance

The National Institute of Justice (NIJ) has identified some key outcome variables and other parameters of interest for this technology, and has provided some guidance on possible evaluation designs. Applicants may depart from this guidance by providing appropriate rationale.

The advantages of a regional automated database relative to a fragmented, paper-based system of recordkeeping are patently obvious:

- Investigators can search for stolen property throughout a region, no longer being confined to their local jurisdictions.
- Investigators can track suspects in terms of their fencing patterns and the kinds of items they steal.
- Investigators can identify pawnbrokers who continually receive large quantities of stolen goods.
- Regional victims have a greater likelihood that their stolen property will be returned.

Acquiring the data that documents these gains is a formidable challenge, however, because pre-database records are scattered over local jurisdictions in paper storage. These challenges apply equally to all standard designs. Other challenges to experimental and quasi-experimental designs are also noted in this evaluability assessment.

Technology Summary: Pawnbroker databases are used to provide property crime investigators with electronic access to records of all pawnbroker transactions in their region. These databases allow investigators to search for property, individuals, or suspicious behaviors across multiple jurisdictions. Previously this investigation was paper based; the new system frees investigators' time for deeper investigations.

Scope of Evaluation: Two evaluation types are possible: a randomized design and a quasi-experimental design. In a randomized design, outcomes from a team or teams of investigators using the system would be compared against outcomes from a team not

using the system. However, police agencies with access to pawnbroker data would likely be reluctant to restrict access for a control group, and isolation of the experimental and control groups may prove difficult. An alternate design would be to analyze time panel data from Minnesota's Automated Pawn System (APS) to observe changes in rates of property recovery among counties as they were added to the system.

Summary of Evaluability Assessment Activity: The evaluability assessment was composed of a review of available documents and printed materials on each of the systems in use today as well as indepth interviews with users and directors of the three regional pawnbroker databases; the Regional Pawn Data Sharing System (RPDSS) (Washington, D.C. area), the Automated Pawn System (Minnesota, Wisconsin), and the Florida Integrated Network for Data Exchange and Retrieval (FINDER). A site visit was conducted at the Montgomery County (Maryland) Police Department, users of the RPDSS.

Finding: Although much anecdotal evidence exists as to the benefits of pawn databases, no evaluation has yet directly shown benefits in terms of labor saved, property value recovered, or increased arrest rates of property criminals. A quasi-experimental evaluation in a data-rich system such as Minnesota's APS could provide valuable information on the benefits of this technology.

1. 1. Initial Screening

Background

Brief technology description

Within the past decade, electronic data-sharing systems have emerged as a tool to help law enforcement agencies track and retrieve stolen goods that criminals have attempted to launder through secondhand markets. Pawnbroker venues are of special interest to law enforcement for a variety of reasons. Foremost, pawnshops can provide a relatively quick and easy way to dispose of stolen goods, which, according to some researchers, may even create a market incentive for theft (Fass and Francis, 2004).

Pawning occurs when an individual offers an item of value as collateral for a loan (Moseley, May 2005). Pawning may not differ substantially from other secondhand markets, according to some researchers, except perhaps in the prevalence of pawnshops in certain areas and their ability to allow customers to unload a variety of goods quickly (Fass and Francis, 2004). Most States already regulate pawnshops and require pawnbrokers to collect some basic data on any merchandise that passes through their stores. However, the details of the regulations themselves may vary substantially from State to State, especially concerning the type of information or data that pawnshop owners are required to collect on the customers who deliver goods to their stores (Moseley, May 2005). In addition, it is not clear how successful States have been in tracking pawnshop transactions and enforcing regulations. Older tracking systems for pawnshops frequently use handwritten slips that either pawnshop owners or law

enforcement officers themselves must manually enter into databases. The process, by many accounts, can be difficult and time-consuming, especially given the high volume of goods that can pass through a pawnshop and the frequent understaffing of those shops. All in all, older tracking systems that rely on hand-written data frequently do not accommodate the quick turnaround time that law enforcement needs to solve theft cases (Fass and Francis, 2004; Business Watch International, 2006).

Electronic data-sharing systems, by contrast, can facilitate the tracking of stolen merchandise by being substantially quicker and easier to use. Pawnbroker databases can operate through a variety of interfaces—either through specialized software that pawnbrokers use to upload basic data that law enforcement can access immediately, or through a similar Internet-based data entry system. Law enforcement can then search pawnbroker databases through a variety of search functions that identify items by serial numbers or identifying markings (when available) or by description (Hurley, 2000). When States require pawnshops to collect information on their customers, law enforcement can use databases to search by seller profiles. Seller profiles can be especially useful in targeting frequent pawners, who may be more likely to traffic in stolen goods (Fass and Francis, 2004; Dougherty and Liao, 2005). The difficulties that hinder identifying stolen goods through pawnbroker databases are the same difficulties that confront theft cases in general: many stolen goods do not have identifying markings or serial numbers that owners have recorded. To increase the chances of recovering stolen goods, some pawnbroker databases have widened their net to include other secondhand goods outlets, like flea markets, precious metal or antique dealers, or even eBay.

What is the background/history of this technology?

Maturity (i.e., lab prototype? Field rollout? Multiple generations/manufacturers?)

The pawnbroker databases available today are actively in use in many departments throughout the country.

Time in the field?

The oldest pawnbroker database system is the Automated Pawn System of Minnesota (and now western Wisconsin). APS has been in place since 1997, though the number of districts using the system has grown over the years. Two of the most frequently discussed databases, LeadsOnline.com (which serves a variety of secondhand goods markets) and RPDSS, have been in use since 2000 and 2004, respectively.

Prevalence in the field? (Is site a first/early adopter?)

Although the actual number of municipalities or law enforcement agencies that use record management systems is unknown, a review of recent literature on pawnbroker databases suggests that such systems have become increasingly popular and visible within the past decade. In addition to RPDSS, used in the Washington, D.C., metropolitan area, other databases include APS in Minnesota and western Wisconsin, the FINDER system in Florida (a comprehensive system including more than just pawn

transactions), and LeadsOnline. LeadsOnline, the pawn database supported by the National Pawnbroker Association, has been aggressively marketed to law enforcement departments across the Nation and is now used in at least 12 States. The company's Web site boasts a clientele of nearly 600 law enforcement agencies that subscribe to its services throughout the U.S.

What do we already know about technologies like these?

The preliminary evaluations of some pawnbroker databases have been markedly positive. According to a press release by the Metropolitan Washington Council of Governments, RPDSS resulted in more than 1,300 arrests and the recovery of more than \$4 million in stolen property (MWCG, 2005). Other evaluations of RPDSS offer examples of particular cases in which the database was instrumental (according to the accounts of law enforcement officers) in apprehending suspects and recovering stolen goods (Hawdon and Ryan, 2006). The database, for example, can show when particular individuals are pawning items frequently—sometimes several times a day—and can tally pawning transactions and identify trends that may point to criminal activity (Moseley, June 2005). Promising data like these may serve to further popularize such systems within the next few years.

However, several evaluations of pawnbroker databases have focused primarily on the perceptions of law enforcement officers who use such databases. Furthermore, the response rates of some studies have been low, and those studies relied heavily on anecdotal data and respondent recall (Moseley, June 2005). The success of pawnbroker databases depends on a number of factors, including an agency's ability to purchase and maintain such a database; the ease of use of the database; the agency's ability to train detectives, investigators, and pawnbrokers on the uses and functions of the database; and the degree of buy-in from pawnbrokers themselves. This last issue may be especially significant, given the documented objections on the part of some pawnbroker representatives to collecting personal, identifying information on their customers and turning it over to the police. (Although several States already require that pawnshops collect customer data, compliance and enforcement may have been inconsistent in the past.)¹

What could an evaluation of this technology add to current knowledge?

There is ample anecdotal evidence of the benefit of this technology but very few evaluations have measured real benefits in terms of labor saved, property recovered, and reduced crime. The few evaluations that have been conducted have extrapolated value saved from surveys with relatively low response rates. A well-done evaluation would be able to quantify benefits much more accurately.

Which audience(s) would benefit from this evaluation?

- Law enforcement agencies

¹ In 2001, after law enforcement in Fort Worth, Texas began using LeadsOnline.com, representatives of the city's pawnbroker industry objected to the increased scrutiny of their operations, and cited privacy rights within the Texas Constitution to question whether police agencies had probable cause to force businesses to disclose personal information (Office of Consumer Credit Commissioner, Texas, 2001).

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- Pawnbroker industry (potentially)
- Database companies and developers who sell such technology

What could they do with the findings?

Showing the benefit to law enforcement and thus to the community of these systems may allow law enforcement to better defend the use of these systems against political attacks.

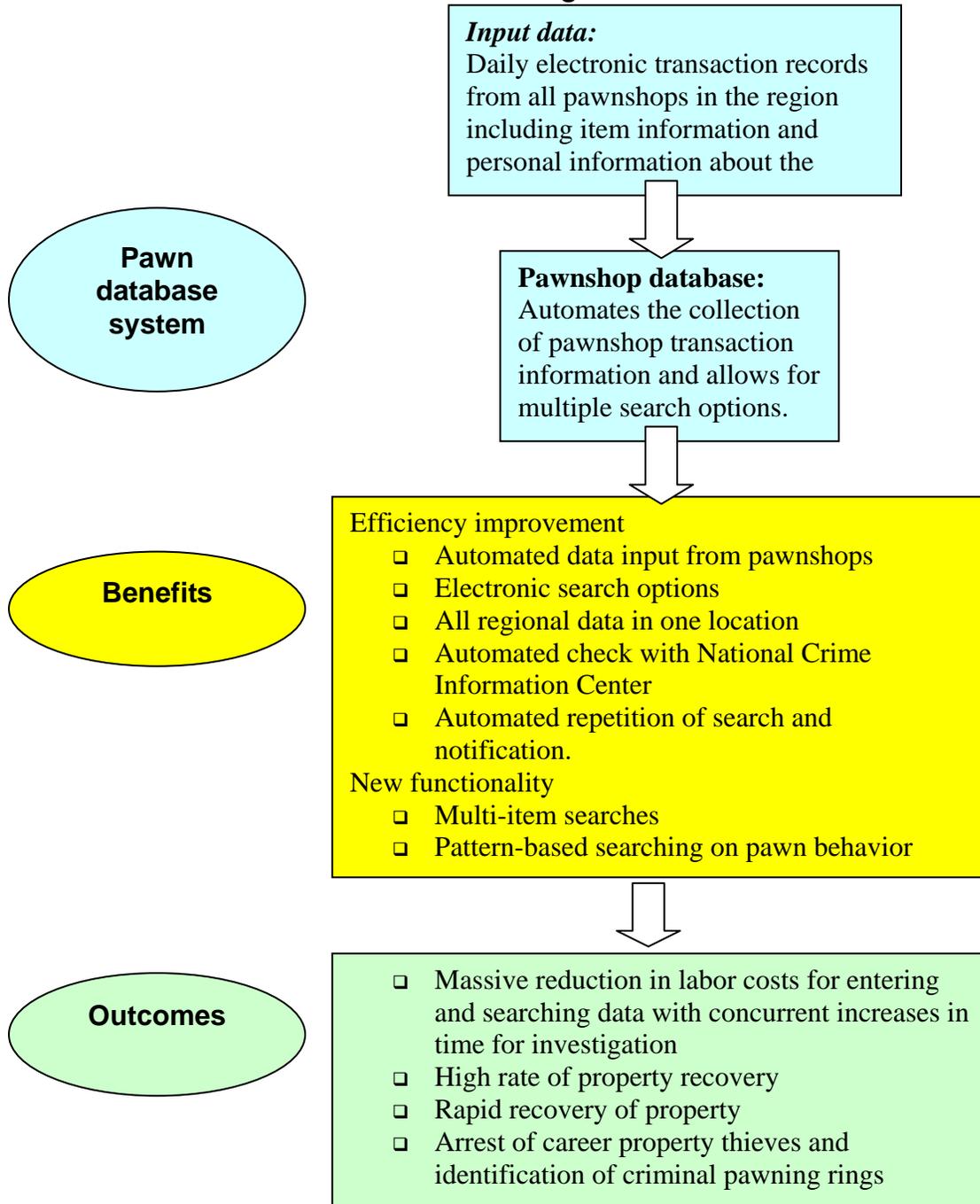
At what stage of adoption/implementation is the technology?

For the initial site visit we focused on the RPDSS system as implemented in the Montgomery County (Maryland) Police Department. The technology has been in place there for a year and a half. It has been actively used by property crime detectives during that time.

What efficiencies or primary/secondary outcomes are expected?

Sketch the logic by which technology use should affect goals (see exhibit 1).

Exhibit 1. Pawnbroker Database Logic Model



Are there operational alternatives that could be used for comparison?

The operational alternative to these systems is the paper-based system that requires investigators to sift through tickets by hand or enter tickets by hand into a department-specific spreadsheet. A comparison of police districts that use the system and that do not use the system is unlikely to be productive, because an investigator would be challenged to establish that the comparison district is a suitable counterfactual.

A more useful approach would rest on a pre-post design where the same police department would compare outcomes before and after the system had been implemented. An even more useful comparison would use panel data to compare the outcomes across districts that varied in when they introduced the system. Minnesota is especially attractive given the active use of a pawnbroker system across the State and in bordering Wisconsin.

Other comparisons might be useful. Pawnbroker systems provide data; but analyses are the means that convert the data into information. A useful comparison might examine how different agencies use their data: Can they search for patterns according to seller identity? Once they find a pattern, what do they do with the information?

Is the site interested in being evaluated?

Montgomery County, Maryland, police are willing to participate in an evaluation. They have already taken part in a user survey of the system conducted by researchers at Virginia Tech, entitled "An Evaluation of the Regional Pawn Data Sharing System" (Hawdon and Ryan, 2006). This evaluation did not directly measure any outcomes, but estimated the benefit of the system based on respondent answers to an open-ended survey question.

Is the site planning an evaluation?

No evaluation of the system is currently planned.

Data Sources

What data systems exist that would facilitate evaluation?

The only statistics readily available from the system are statistics on usage, such as the number of searches conducted. No outcome statistics are reported within RPDSS. Each county is responsible for its own outcome reports. These may be annual, semi-annual, or at best monthly reports documenting outcomes such as number of items recovered, number of arrests, and (pawn) value of items, laboriously gathered from paper-based case files. Systemwide outcomes have

been difficult to gather. A report on RPDSS success from June 2005 attempted to gather information on outcomes in an e-mail survey of investigators (Moseley, June 2005). Those who responded reported significant benefits but represented only 16 of the 474 investigators using the system (3 percent).

What key data elements are contained in these systems?

None of the key outcome events are tracked by RPDSS.

Are there data to estimate unit costs of labor and capital?

Few data are available to estimate costs of labor and capital. RPDSS was developed on a \$1-million grant partnering NIJ with the Council of Governments in the National Capital Region. Ongoing system costs involve the storage of data on servers, the maintenance of the system, and the service contract with the vendor, BWI. Although data on these costs could be identified, no data on the cost of training or reduced labor costs for data-entry are currently available for RPDSS.

Are there data for possible comparison technologies or other solutions?

Quantitative data on comparison technologies is not currently available. The alternative to RPDSS is a paper-based system requiring hand entry of data into a database. The benefit of RPDSS is a shift of labor from data-entry to investigation, which may not lead directly to reduced labor costs. Furthermore, the outcome data for the paper-based system will be as difficult to obtain as that for the RPDSS system. It may be possible to involve a county in the National Capital Region that has not yet joined RPDSS and compare it with a county already in the system. However, RPDSS has been very successful in recruiting all of the populous counties near the capital. Counties not currently in the RPDSS system are likely to have lower populations and fewer resources than counties within the system.

In general, how useful are the data systems to an impact evaluation?

The data systems currently available within RPDSS are not very useful to an impact evaluation. Data on outcomes would have to be generated before any evaluation could be conducted. Counties vary in the statistics they use to document outcomes, so there is no standard. An evaluation could demand significant time resources of participating police departments.

2. Site Visit Screening

The Intervention

Has the organization implemented a policy or training for the technology's use?

Montgomery County provides training for all officers and pawn investigators before they gain access to the system. The training is minimal because the system has been designed to be user friendly. Additional questions are answered by the chief pawn investigator.

Who are the users?

The users are primarily property crime investigators, typically one per county. These systems greatly increase efficiency in their work and have received wide praise. Sworn officers who choose to do so may also have read-only access to the database to conduct their own investigations into property crimes.

Who/what are the targets?

The target is any use of pawnshops for the purposes of property crime. The pawn database identifies stolen property among pawned items and property criminals who use pawnshops to sell stolen items.

Who/what gets excluded as a user or target?

Property criminals who sell stolen property directly or personally use the stolen items will not be identified. Only those who come in contact with pawnshops can be identified. Furthermore, criminals who use pawnshops outside the larger National Capital Region will not have their transactions noted in the database. Because pawnshop tickets include personal descriptions of each pawner, criminals who use false names may still potentially be identified with this system.

Have the characteristics of the user or target population changed over time?

Both the user population and the target population have grown as RPDSS has become more widely adopted by districts in the National Capital Region. Additional districts may join in partnership in coming months, increasing both the number of departments with search access and the base of pawn data available for search.

What values/outcomes do users see/envision in the technology?

The most significant value observed by users of the pawn database is the increase in efficiency. Prior methods included entering hundreds of paper tickets into a district-specific database. This would require at least one full-time employee. Oftentimes entry of paper tickets was delayed and incomplete due to limited manpower. Furthermore, searching was extremely time-consuming, including the check of both the database and the unfinished paper tickets.

Because searching was very time-consuming, searches were not conducted multiple times even though a stolen item might take days or weeks to appear among pawned items.

The pawn database system fully automates data entry and greatly enhances searching. Searches can be automated to repeat several times and automatically notify the detective of a hit. All items with a serial number are automatically checked against NCIC records of stolen property. Data is accurate and timely, allowing stolen items to be recovered much more quickly than in the past. The dramatic reduction in man-hours required for data entry and search has allowed property crime detectives to spend a greater amount of time on investigations. This also results in an increase in recovery of smaller items such as cameras, which, in the past, were too small to warrant the man-hours required for investigation.

Furthermore there are additional functionalities that were not possible in the past. For the first time data is available from other districts, allowing property crime detectives to recover property that was taken outside their district or even their state before it was pawned. This is a common tactic and this functionality has greatly increased pawn detectives abilities. Multi-item searches can be conducted to identify multiple items stolen during one robbery even if these items were pawned at different locations. Searches can be conducted based on suspicious behavior, such as the pawning of more than \$20,000 worth of merchandise within one month, even if the individual pawned items at several different pawnshops. Other behaviors such as multi-district pawning or pawning of many new-in-box items in a short period can also be searched. Searches can also be automated to notify detectives if former property criminals break parole by pawning items. The pawnbroker database essentially enhances property crime detectives' efficiency in property recovery and ability to identify career property criminals.

The outcome of these increases in efficiency and new functionality is a much higher rate of recovery of property and identification and arrest of property thieves.

What are the limitations/obstacles to using the technology?

Property crime detectives can only identify stolen property within the districts participating in the database system. Criminals may relocate their transactions to areas that are not yet in a pawn database. Also, not all pawn systems allow searches based on behavior patterns. All systems allow searches based on specific property items, but some of the most productive searches for investigation may not be available.

What outcomes could be assessed? Using what measures?

The operative question is “What outcomes should be assessed?” One might think of a pawnbroker database as a tool for reducing property crime or, at least, for increasing the rate at which property crimes are cleared and thieves are prosecuted. If this were the most important question, then an evaluator might examine reported thefts in a district, or clearance rates for reported thefts, or both.

One might think of a pawnbroker database as a tool for recovering lost property. If this were the most important question, then the investigator might examine the rate at which property is recovered. The investigator might monetize the recovery using the value of the property.

Still a third question might presume that neither of the above two questions are important, and that the real key to a pawnbroker database is that it provides the police with a less expensive method of performing the same job that they performed using paper records.

If the first question were important, than an investigator might use public records of reported thefts and of crimes cleared by arrest. Any investigator should be aware of the limitations of arrest/clearance data.

If the second question were important, than an investigator would want a list of stolen property and a list of recovered property, ideally with enough description to monetize the dollar gain to the victim (or the insurance company as his or her proxy) from recovering the stolen property.

If the third question were important, the answer would seem to depend on a qualitative evaluation. How has investigator time been increased by his or her being relieved from coding data? What productive use of his or her time has resulted?

Of course, an investigator might be interested in all the above questions. Each might be incorporated into an evaluation.

Designing a Study

Are there other operational environments for which the technology is well suited?

What are the constraints in such environments?

A pawnbroker database would seem to be most effective when the pawnbroker is honest and the pawnbroker is dishonest. Other than avoiding time required to report to the system, the pawnbroker has no incentive to hide or falsify transactions. If the pawnbroker is dishonest, serving as a launderer for stolen goods, then both the pawnbroker and the pawnbroker have an incentive to obscure transactions.

Similar systems exist in other settings. With respect to firearms, the National Rifle Association summarizes Federal law:

Sale of a firearm by a federally licensed dealer must be documented by a Federal Form 4473, which identifies and includes other information about the purchaser, and records the make, model, and serial number of the firearm. Sales to an individual of multiple handguns within a 5-day period require dealer notification to the Federal Bureau of Alcohol, Tobacco and Firearms. Violations of dealer recordkeeping requirements are punishable by a penalty of up to \$1,000 and 1 year's imprisonment (National Rifle Association, 2006).

This system might be used to track the origin of guns used in crimes, but a 2004 report by the Inspector General of the U.S. Department of Justice indicates that the system does not function well (U.S. Department of Justice, Office of the Inspector General, 2004)

Do the technology “events” permit randomly generated applications of the technology?

If not, can comparison samples be formed? With what difficulties?

A random design experiment would be difficult to establish in Montgomery County or anywhere else where theft investigators already have access to a pawnbroker database. Conceivably, an evaluator could randomly assign a pool of police theft investigators to a group that has access to the pawnbroker database and another group that lacks access to the database. Still, it seems unlikely that an agency that had access to pawnbroker data would agree to restrict some of its investigators from having access.

It is possible, however, that a Federal grant could pay for access to a pawnbroker database for a large agency that did not already have access to pawnbroker data. A condition would be that the agency would randomly assign its investigators to two units. One would pursue theft investigations using traditional means, e.g., without access to the pawnbroker data. The other would have access to the pawnbroker data. At the end of the experiment, all investigators would have access to the pawnbroker data.

Of the three questions posed earlier, this random assignment design could answer the second (Does the property recovery rate increase?) and the third (How is investigator time enhanced?). This design could partially answer the first question (Does the clearance rate increase?) but it could not answer the question of whether theft rates are sensitive to use of the pawnbroker data. It is, however, difficult to see how the treatment group could be isolated from the control group, so the estimated treatment effect would be biased.

Moreover, this randomized design does not deal with an additional important issue: How does the success of a pawnbroker database increase as the coverage increases? It would be difficult to answer this question experimentally.

Montgomery County does not seem to offer an ideal location for a quasi-experimental design. An evaluator might consider the State of Minnesota as an alternative. Minnesota is an attractive site for a quasi-experiment for several reasons. Minnesota provides panel data from across the state and overlapping into Wisconsin. (Panel data comprise a time-series of cross-sectional units.) Counties introduced pawnbroker data at different times, so the time-series aspects of these data would be informative. We would expect favorable outcomes in county X as county X introduces a system and favorable outcomes as county Y that lies next to county X introduces its own system. Because the Minnesota data date back to 1997, the time series would be longer than a decade (by the time an evaluation is funded), and a time series of this length provides the prospect of a strong quasi-experimental design based on instrumental variables.

We are uncertain of data availability from Minnesota. County-specific theft data and clearance rates are almost certainly available, so the first question would be answerable. We do not know if the counties could provide summary data on theft recovery rates, although we presume that such statistics could be assembled from public records. Alternatively, insurance companies might be willing to provide recovery rates for items reported stolen across Minnesota counties over time. Answering the third question might best be done using qualitative techniques—such as questionnaires. Although others have found survey response rates to be low, the survey need not be burdensome because it is only intended to ask about time savings, and techniques to promote followup (multiple mailings and telephone followup) could be implemented across Minnesota police agencies without high costs.

The strategy proposed for Minnesota could also be applied to RPDSS in the Washington, D.C. area. The constraint is that the system has been in place only since 2004, so it does not provide the same advantages as the lengthier time series in Minnesota.

How many times would the technology be applied in 1 year?

The technology is used continuously.

Will modest but statistically significant effect sizes be detectable given sample sizes?

Given the prevalence of property crime, we would expect that sample sizes will be adequate to detect a moderate or even small treatment effect. This assumes that pawnbrokers play an appreciable role in laundering stolen property.

How many units—if any—would have to be procured for an evaluation?

No procurement would be required unless an evaluator proposes a random assignment design.

What does a control/comparison group receive?

The comparison group would receive theft investigations based on a paper record system and whatever reporting requirements were in place at the time that the pawnbroker database was adopted.

What kinds of data elements are available from existing data sources?

The pawnbroker database only reports pawnbroker loans. Outcome data would have to come from other sources.

What specific input, process, and outcome measures would they support?

The existing sources only collect process-type measures such as the number of times a system has been accessed and the number of items that have been placed on hold by an investigator. The data in the system contain specific information on the value of items pawned and descriptions of both the pawned items and the individual who pawns them. However, nothing included in the data distinguishes legitimate pawn transactions from illegal pawn transactions. The pawn database is merely a tool to help investigators identify suspicious transactions.

How complete are data records? (Attain samples if possible.)

This is unknown.

Can user and/or target populations be followed over time?

Yes, this is a feature of a pawnbroker database. Loans to the same individual are indicative of theft for profit.

Can the dosage of technology used be identified?

Yes, depending on the design. At one level, the dosage depends on how contiguous agencies have implemented the system. At another level, dosage depends on the number of investigators that a police agency allocates to investigating theft relative to the amount of theft reports. Regardless of the utility of the pawnbroker database, theft investigations take time, and we would expect that outcomes will be sensitive to the inputs of investigator time.

Can data systems help diagnose implementation problems?

No, this seems unlikely.

What threats to a sound evaluation are most likely to occur?

A random design experiment suffers from the problem that the control subjects (investigators who lack access to the pawnbroker data) would be contaminated by treatment subjects (investigator who would have access to the data). This problem might be reduced by randomly assigning sites to receive pawnbroker databases, but the expense of such a study is prohibitive, and anyway, treated counties would still contaminate untreated counties.

The problem with a quasi-experiment is that one can never be sure that the counterfactual is valid. A lengthy time-series is an ameliorative, however, for two reasons. The first is that a panel design allows the evaluator to based inferences on a difference of difference approach. The second is that a lengthy panel may lend itself to the use of instrumental variables.

What changes is the site director willing to make to support the evaluation?

We are uncertain that any changes are required.

3. Overall

Would you recommend that the technology be evaluated? Why or why not?

Yes, either a random design experiment or a quasi-experiment would yield useful information about how pawnbroker databases affect theft and theft recovery. The utility of a pawnbroker database has face validity. Although pawnbrokers are not the only outlet for laundering stolen property, they are both convenient and visible to thieves. Alternative sources, such as third parties who purchase for resale, would be much harder to locate (because their operations are covert) and likely are less willing to deal in small commodity items. One would reason that removing pawnbrokers as a convenient source for laundering stolen property could greatly reduce the incentive for theft for profit.

Furthermore, if either Minnesota or some other location could provide suitable and readily available outcome data, an evaluation should be able to provide a compelling estimate of treatment effectiveness.

What type of evaluation design would you recommend?

As noted above, we recommend either a random design experiment or a quasi-experimental design in a place that provides suitable panel data.

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