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R STREET POLICY STUDY NO. 41
September 2015

THE COSTS AND BENEFITS OF SUBJECTING JUVENILES TO SEX-OFFENDER REGISTRATION AND NOTIFICATION

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INTRODUCTION

Over the past two decades, state and federal governments have enacted a series of laws intended to reduce the incidence of sex offenses, especially those committed against children.¹ Though it was not the first such legislative act, New Jersey's Megan's Law in 1994 is recognized widely as the key example of the genre. That same year, Congress enacted the Jacob Wetterling Act (108 Stat. 2038) and a federal version of Megan's Law (110 Stat. 1345). About 10 years later, Congress passed the Adam Walsh Act (120 Stat. 587), also known as the AWA.

These laws required the registration of sex offenders and, over time, expanded the systems to notify the public about the schools they attend, the places they work and the homes in which they live. Lawmakers believed these regulations

1. Revised Sept 22, 2015. The author gratefully acknowledges the financial support of this R Street Institute for the preparation of this report. All analyses, inferences and conclusions belong to the author.

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would deter future sex crimes; make it easier to identify and apprehend previous offenders who commit new sex crimes; and enable the public to better protect itself from the commission of sex crimes.

This report consists of a pair of benefit-cost analyses of the application of registration and notification laws to juvenile sex offenders. The first is a quantitative *retrospective* assessment of the benefits and costs of registration and notification laws as currently enacted and implemented. There were no such analyses prepared before the enactment of these laws and no credible retrospective benefit-cost analysis appears to have been published over the intervening decades.

The second is a qualitative *prospective* benefit-cost analysis of several alternative reforms that warrant consideration. These alternatives are informed by the retrospective benefit-cost analysis. Additional analytic work would be needed to develop plausible quantitative estimates of benefits and costs.

Section I provides an executive summary of the retrospective benefit-cost analysis. Section II describes what is covered in and excluded from these analyses. It discusses important limitations that must be taken into account when drawing inferences. Sections III and IV are the retrospective and prospective benefit-cost analyses.

SECTION I: EXECUTIVE SUMMARY

Every state and territory in the United States has registration and notification laws that apply to adults convicted of, and juveniles adjudicated delinquent for, certain sex offenses. Most jurisdictions enacted these laws on their own, but expanded them in response to the Adam Walsh Act of 2006 (AWA).

Registration laws require offenders to appear in person to provide identifying information (e.g., fingerprints, DNA samples) and, at least once a year, to provide an updated current photograph. States vary with respect to the kinds of additional information they require, but the list is extensive. An in-person update also is required for any covered change in life circumstances. These include changes in residential, school, work or email addresses, screen names and even blog avatars.

The time allowed to complete each update is short. Failure to register or update an existing registration is itself a felony. Offenders may be covered by multiple states, each with its own rules and procedures. Notification laws make some of this information publicly available via the Internet.

Registration is calculated to produce about \$200 million in social benefits per year. Social costs are calculated to range from \$200 million to \$2 billion, depending on the proportion

of registrants listed due to offenses committed as juveniles. Thus, net benefits are calculated to range from -\$40 million to -\$1 billion per year, with present-value net benefits that range from -\$2 billion to -\$20 billion.² This result depends on a small number of parameters. First, based on the best available study in the literature, which applies to all sex offenders and not just juveniles, registration is assumed to have reduced sex-offense recidivism by about one-eighth. This translates into an annual reduction of about 800 major sex offenses committed by juveniles.

Notification is estimated to produce no social benefits, with social costs per-year that range from \$10 billion to \$40 billion and present-value costs that range from -\$100 billion to -\$600 billion. About three-fourths of these costs are borne by sex offenders' neighbors. This occurs because living near a registered sex offender – whether an adult or juvenile – has a substantial “disamenity” value. Costs imposed on juvenile offenders are calculated to range from \$400 million to \$2 billion per year. Costs on their families are calculated to add another 50 percent to these amounts. Additional costs on third parties are calculated as: \$3 billion per year on employers for registry searches; \$100-\$500 million on employers for adaptation and mitigation of employment issues; and \$200 million to \$1 billion on the public for registry searches.

Because notification cannot produce net benefits, the qualitative prospective benefit-cost analysis focuses on ways to reduce the social costs of notification. A number of reform alternatives warrant consideration to reduce the substantial net social costs of notification. These alternatives involve exempting certain fractions of registrants listed due to offenses committed as juveniles. High-quality risk assessment is necessary to minimize false positives.

SECTION II: SCOPE AND LIMITATIONS OF THE ANALYSES

A. Scope

This paper relies exclusively on the existing published literature determined to be relevant for benefit or cost assessment. No new data were collected and no new analyses of original data were conducted. The retrospective analysis is quantitative but dependent on the existence, quality and practical utility of existing published analysis prepared by others. Almost all of these studies address sex offenders generally, not juvenile offenders, and results that apply to all offenders are interpolated to apply to the juvenile subset.

Other provisions of laws containing registration and notification requirements are excluded, as are certain ancillary

2. In these calculations, and others that follow, calculations are reported with one significant figure. Readers are strongly advised not to interpret greater precision.

regulatory provisions, such as residency restrictions that may have been promulgated later. In jurisdictions where residency restrictions were imposed at the same time as registration and notification, some outcomes may be jointly produced, such that identifying the provision responsible for a particular observed effect would be difficult at best, and may be impossible.

Similarly excluded from the analysis are the benefits and costs of separate provisions that impose penalties for failure to register and failure to maintain the accuracy of one's registration. This exclusion is primarily due to budget constraints resulting from data gaps and methodological challenges, not because failure-to-register isn't important. The benefits of penalizing noncompliance are complex. This is particularly true given the known limitations in data quality, even when compliance isn't an issue. Costs are zero for those who comply, low for those who aren't prosecuted for failure-to-register and extremely high otherwise.

Throughout this paper, no position is taken with respect to the normative question of whether registration and/or notification laws *ought* to apply to juvenile sex offenders. Rather, the sole purpose of this analysis is to develop estimates of benefits and costs that are as objective as possible, recognizing the unavoidable need to use best professional judgment when evaluating multiple strands of evidence of highly variable quality.

A notable feature of this paper is it takes information quality seriously, especially statistical information and analyses. Greater weight is given to peer-reviewed over non-peer reviewed studies. However, peer review is not presumed to provide evidence of objectivity or impart a talismanic belief in fundamental correctness. Studies performed by advocacy organizations are required to meet a higher information-quality standard to compensate for bias that advocacy tends to impart.³ Studies that rely on statistical sampling are expected to adhere to generally accepted principles for statistical practice.⁴ Where this is not feasible, scholars are nevertheless expected to refrain from drawing inferences that cannot be supported by the quality of their data and the statistical methods used. In cases where that professional rule is not followed, confidence in the quality of the work is necessarily diminished.

B. Limitations

The quantitative benefit-cost analysis in Section III depends on the quality of the data and analyses that have been published. Unfortunately, many of the available studies do not devote sufficient attention to data quality. Excess precision

3. Office of Management and Budget (2002), Office of Management and Budget (2005).

4. Office of Management and Budget (2006).

is an especially troubling and common information-quality defect, for it incorrectly leads readers to infer much more confidence than is justified by the quality of underlying data.

To avoid this problem, benefit and cost estimates reported here are limited to a single significant digit. The purpose of this limitation is to deter readers from inferring excess precision and to provide a constant reminder that precision is limited. In addition, readers should not interpret the single significant digit according to usual conventions. Thus, a figure of "about \$100 million" should not be interpreted as somewhere between \$99.5 and \$100.4 million. Rather, it reflects an order of magnitude. Where assumptions uninformed by empirical evidence were made, values were chosen in orders of magnitude or their approximate square roots. Thus, an assumed unit value of \$1,000 means that \$300 was considered likely to be too low and \$3,000 too high.

There are several benefit and cost categories for which no credible estimates could be derived from the literature. In these cases, the quantitative analysis reports missing values, with a note indicating whether this missing data poses a major gap (i.e., a material impact on total benefits or costs) or minor gap (i.e., no such impact). The value *zero* is reserved for categories of effects where zero is the best professional judgment of the magnitude based on economic theory, empirical evidence or both.

Due to resource constraints, no analyses of variability or uncertainty have been conducted. This is a key limitation because substantial variability and uncertainty exist, most notably with respect to the proportion of registrants listed due to offenses committed as juveniles. Where appropriate, sensitivity analyses have been conducted to ascertain the robustness of the results.

SECTION III: RETROSPECTIVE BENEFIT-COST ANALYSIS

This section summarizes the results of retrospective benefit-cost analysis. Subsection A addresses a few important information-quality matters. Subsection B introduces a list of model parameters. Subsections D and E cover the benefits and costs of registration and notification, respectively.

A. Information quality

Criminal-justice research relies heavily on a few federal databases. Most notable are the *Crimes in the United States* series, based on Uniform Crime Reports, and the *National Incident-Based Reporting System*, both maintained by the Federal Bureau of Investigation. These reports assemble information in formats prescribed by the FBI and using FBI definitions, but provided voluntarily by local law-enforcement agencies

that may not follow the FBI's many directives. Although the FBI is legally required to ensure the assembled data satisfy federal information quality standards,⁵ there is no public evidence that it has ever attempted to do so. Instead, the FBI publishes disclaimers that simultaneously deny the existence of applicable information-quality standards and shift to others the responsibility for meeting them. For this reason, researchers should be exceedingly wary about relying on these databases. Unfortunately, such circumspection is rarely observed in the scholarly literature.

The U.S. Department of Justice maintains a database on crime victimization collected via the *National Crime Victimization Survey*. This data series is useful insofar as it provides a “victims’ eye” perspective on the magnitude and characteristics of sex offenses. However, the survey allows respondents to decide which events qualify as instances of sex offenses. Predictably, the NCVS reports a much larger number of incidents than are contained in the FBI’s databases. Leaving aside the important-but-charged question of which estimate is closer to the truth, registration and notification laws cannot have any material deterrent effect on the incidence of sex offenses that are not reported. Indeed, there are reasons to believe these laws actually deter reporting, especially by family members who rationally want to avoid the adverse effects that will be imposed on them if the offender is legally sanctioned.⁶

Many studies in the literature are based on small, so-called “convenience” samples, and this is especially so for studies of juvenile offenders. Only rarely do these samples have known statistical properties that allow results to be generalized to any population. These studies have been used to inform the benefit-cost analyses herein, but not to guide assumptions or select quantitative values.

B. Model values

The retrospective benefit-cost analysis model includes a number of assumptions and derived constants. They are listed in Table 1 and discussed as appropriate below.

C. Baseline

The magnitude of the problem posed by juvenile sex offending is subject to considerable uncertainty. To ensure internal consistency, the baseline level of social cost is assumed to equal the number of violent sex offenses committed per year (70,000) multiplied by the fraction attributable to juveniles (20 percent) and the estimated value of avoiding a random

TABLE I: MODEL VALUES USED IN RETROSPECTIVE BENEFIT-COST ANALYSIS

MODEL VARIABLE	VALUE
Arrest_Rate	50 percent
Conviction_Rate	90 percent
Discount_Rate_Adult	7 percent
Offender_Wages_Lost_Pct	50 percent
Offender_Wages_Lost_Pct_Max	100 percent
Offender_Wages_Lost_PV	\$178,129
Offender_Wages_Lost_Years	60
Offender_Wages_LT_HSEd_Annual	25,376
Offender_Wages_LT_HSEd_Weekly	488
Offenders_2010	485,000
Offenders_First_Time_Pct	95 percent
Offenders_Pct_Increase_Annual	6.2 percent
Offenders_2015	654,264
Offenders_J_Family_Size	2
Offenders_J_Family_Burden	\$3,000
Offenders_J_Family_IncomeLoss_Pct	50 percent
Offenders_Juvenile_Pct_Low	5 percent
Offenders_Juvenile_Pct_Mid	17 percent
Offenders_Juvenile_Pct_Hi	33 percent
Offense_Avoided_Value_1987	\$100,000
Offense_Avoided_Value_2015	\$209,000
Offenses_Annual	60,000
Offenses_Juvenile_Pct	33 percent
Paperwork_Burden_Notification	\$0
Paperwork_Burden_Registration	\$1,000
Reduction_Incidence_Notification	0 percent
Reduction_Incidence_Registration	12.5 percent
Registry_Hours_per_Search	0.05
Registry_Operations_Offender	\$300
Registry_Operations_System	196,279,159
Registry_Searches_Annual	2,355,349,909
Registry_Searches_Month	280,000
Registry_Searches_Pct_Business	30 percent
Registry_Searches_Pct_Public	70 percent
Registry_Searches_Pct_SocialMedia	1 percent
Registry_Value_per_SearchHour_Business	\$100
Registry_Value_per_SearchHour_Public	\$30
Res_Real_Estate_Loss_per_Offender_2006	\$160,000
Res_Real_Estate_Loss_per_Offender_2015	\$160,000

5. Office of Management and Budget (2002).

6. Costs imposed, both directly and indirectly, on offenders’ families provide a rational basis for underreporting of offenses committed against family members. The extent to which registration (and especially notification) laws deter reporting because of these costs is an excellent subject for future research.

incident (\$100,000 in 1987; \$209,000 in 2015). This yields aggregate social costs of \$20 billion per year for violent sex offenses and \$3 billion per year for violent sex offenses committed by juveniles.

D. Registration

The registration process collects extensive information about adults convicted of sex offenses and juveniles adjudicated as delinquent for sex offenses. This information is intended to be made available only to law enforcement. Calculations of benefits and costs assume that information intended to remain confidential to law enforcement stays confidential.

I. Benefits

Table 2 lists three categories of benefits from registration; the only one quantified and monetized is the value of reduced incidence. While several studies have shown no effect, the study with the best data and most robust design estimated the incidence of covered sex offenses was reduced by one-eighth.⁷ Offenses committed by juveniles and adults are assumed to be reduced proportionally. Of the approximately 70,000 annual forcible sex offenses that are reported,⁸ 20 percent are assumed to have been committed by juveniles. The arrest rate for juvenile sex offenses is assumed to be 50 percent, and 90 percent of those arrested are assumed to be convicted and thus subject to registration.⁹ This means about 800 juvenile-committed sex offenses per year are calculated to be prevented by registration.¹⁰

The value of preventing a statistically random violent sex offense is obtained from a National Research Council report.¹¹ This estimate is conceptually comprehensive but was acknowledged at the outset to have data gaps. For this analysis, the authors' \$65,000 per-offense estimate was rounded up to \$100,000 in recognition of these data gaps, and inflated from 1987 to 2015 dollars at the Consumer Price Index (\$100,000 × 2.09 = \$209,000). This yields an annual benefit estimate of about \$200 million.

Registration alone could produce two other potentially significant benefits: enhanced law enforcement and reduced

community expenditures on inefficient precaution. Registries presumably aid law enforcement by enabling them to focus investigative resources. However, whether this is effective depends on the extent to which registered offenders are objectively more likely to be suspects.

Registries also could lead to a greater sense of safety independent of any actual reduction in incidence. But reduced risk perception is not a benefit, however; only actual risk reduction is counted in benefit-cost analysis. Nonetheless, if risk perception exceeds actual risk, and the creation of a registry reduces the gap between perceived and actual risk, communities and households may reduce their expenditures on cost-ineffective precaution. Reductions in these expenditures count as benefits.

No studies have been located that provide reliable quantitative estimates that could be used to estimate these two benefits; indeed, no evidence has been found in the literature even acknowledging the possibility of reduced inefficient expenditures on precaution. Therefore, no values for these potential benefits are included in the analysis.

TABLE 2: BENEFITS OF APPLYING REGISTRATION LAWS TO JUVENILES

Benefit Type	Calculated quantity	Unit value (\$000)	Annual (\$M)	Present value (\$M)
Prevented sex offenses ^a				
Registered juveniles (5%)	750	209	200	2,000
Registered juveniles (17%)	750	209	200	2,000
Registered juveniles (33%)	750	209	200	2,000
Enhanced law enforcement ^b	-	-	-	-
Reduced expenditures on inefficient precaution ^c	-	-	-	-

a. One-eighth reduction in incidence from Prescott & Rockoff (2011) Unit value updated from the comprehensive estimate in Cohen, et al (1994).

b. Minor gap. No credible estimates in literature, but highly unlikely to be large.

c. Minor gap. No credible estimates in literature. Existence of registries may diminish excess risk perception, resulting in reduced expenditures on cost-ineffective precaution

2. Costs

Table 3 lists costs organized by the party expected to bear them. Cost-bearers obviously include convicted offenders (who must register) and government agencies (which must process their registrations). Two groups of third parties also should be expected to bear significant costs: offenders' families and non-recidivist registrants subjected to heightened scrutiny by law enforcement. Both are spillover effects. Families experience paperwork burdens and lost work dealing with the ramifications of their children's actions. When law enforcement uses registries to focus investigative resources in response to new sex crimes, in almost all cases, registrants subjected to heightened scrutiny are innocent.

7. Prescott and Rockoff (2011).

8. Federal Bureau of Investigation (2015), Victims by Age Category.

9. Ackerman, Harris, Levenson and Zgoba (2011) report that less than 0.5 percent of registered sex offenders are under 18 years of age, or £ 2,248 of their 49-state sample. Few of these registrants would be recidivists, though it cannot be determined how many were listed in the 12 months preceding the data collection for the study.

10. Additional research is needed to ascertain how much uncertainty surrounds this estimate. The chief uncertainty is not the various multipliers in the calculation, but rather the extent to which prospective juvenile offenders are aware of the consequences of registration and capable of incorporating that knowledge into their decision-making.

11. Cohen, Rust, Steen and Tidd (2004), Tables 24 and 25. Because the identity of a prospective victim is unknown, it is appropriate to assume a statistically random event.

Costs to offenders: The best available evidence is that there were about 485,000 publicly registered sex offenders in 2010.¹² Other figures that are considerably higher are commonly cited, but the methods used to derive them are inadequately described.¹³ Some states also maintain nonpublic registries for minor offenses and for juveniles,¹⁴ but transparent and reproducible estimates of the number of nonpublic registrants have not been found. Moreover, it is not known to what extent offenders originally listed on nonpublic registries migrate to public registries, or whether migration is automatic or the result of a new offense committed as an adult.

To obtain an estimate of the number of public registrants for 2015, the approximate number of annual serious sex offenses (70,000) was multiplied by the estimated proportion of first-time offenders (95 percent),¹⁵ the assumed arrest rate (50 percent) and the assumed conviction rate (90 percent). The 2010 rate was then compounded for five years at the resulting annual growth rate (3.5 percent) to obtain about 650,000 publicly registered sex offenders for 2015.¹⁶

The calculated number of new juveniles annually subject to registration was obtained by multiplying the 2015 total by the proportion of registered offenders who are believed to have registered because of a sex offense committed as a juvenile. The best available evidence of the proportion of public registrants who *are* juveniles (< 0.5 percent) comes from Ackerman et al. (2011). Stipulating that this figure is correct, it still cannot be discerned what proportion of adult registrants were required to register solely due to offenses committed as juveniles. If it assumed that juveniles are added to the registry at the rate of 0.5 percent per year, for average terms of 10, 15, 25 and 50 years (i.e., life) the steady-state percentage of registrants listed solely because of juvenile sex offenses would be 5 percent, 7.5 percent, 10 percent, 12.5 percent and 25 percent. In this analysis, three alternative proportions are modeled: 5 percent, 17 percent and 33 percent.

Cost estimates are highly sensitive to this parameter. Both the magnitude and the sign of net benefits depend on its true (but unknown) value. Keeping all other parameters constant, the net benefits of registering juveniles are positive only if the proportion of registrants listed because of juvenile offenses is less than about 5 percent. Based on the simple steady-state calculation above, this appears very unlikely.

12. Ackerman, Harris, Levenson and Zgoba (2011). This includes about 37,000 offenders in Michigan that the authors dropped from their analyses due to missing data.

13. See, e.g., National Center for Missing and Exploited Children (2012), National Center for Missing and Exploited Children (2015). The authors describe their data as "obtained via a survey of the individual sex offender registries."

14. Human Rights Watch (2013), pp. 43-46.

15. Sandler, Freeman and Socia (2008).

16. The prevailing figure widely cited in public discourse comes from the National Center for Missing and Exploited Children, which recently reported a 2015 figure of 843,260, which is about 30 percent higher. See National Center for Missing and Exploited Children (2015). As previously noted, this figure is neither transparent nor capable of being reproduced by a qualified independent third party.

It is assumed that each juvenile offender bears about \$1,000 in paperwork burden per year to comply with his registration responsibilities.¹⁷ These burdens have not been systematically estimated. They include assembling the required records; appearing in person annually (or more often) to provide them; and taking a day off from school or work to do so. Every change in status also must be reported. At \$1,000 per offender, the aggregate annual cost of paperwork burden on juvenile offenders ranges from \$30 million to \$200 million. If the true cost of burden is, say, \$3,000 per offender, then the range of aggregate cost trebles to \$90 million to \$600 million per year.

Costs to offenders' families: Families of juvenile offenders likely bear similar paperwork burdens. It is assumed, based solely on professional judgment, that this burden is three times greater because of the opportunity cost of parents' lost work time. The aggregate annual cost of registration on families is thus calculated to range from \$200 million to \$1 billion per year.

Costs to governments: Government agencies *that* manage the registries are required to meet in-person with offenders *who* seek to register or update a registration. This requires staff time, even if no dedicated staff is hired for the purpose. It is assumed that government agencies expend resources valued at \$300 per offender per year. Aggregate annual costs to governments for managing juvenile offenders thus range from \$10 million to \$100 million per year. Government costs are a small share of the burden of registration, but tend to capture almost all the attention.

Unquantified costs: Some states have additional regulatory requirements. These may include, for example, residency restrictions, GPS monitoring or mandatory foster care of juveniles adjudicated delinquent for sex offenses committed against family members. These other costs belong in the benefit-cost analysis only if they are nondiscretionary and automatically triggered by registration. No values are included here because no estimates of their magnitude suitable for the calculation of social cost have been found.

The stated purpose of registration is to enable law enforcement to narrow its search for suspects when new sex crimes occur. The best available evidence indicates that registered offenders, even though they are more likely to commit new sex crimes than the population at large, nevertheless are responsible for a very small fraction of the crimes that are

17. The definition of burden used here comes from the Paperwork Reduction Act, 44 USC § 3502(2): "[T]he term 'burden' means time, effort, or financial resources expended by persons to generate, maintain, or provide information to or for a Federal agency, including the resources expended for (A) reviewing instructions; (B) acquiring, installing, and utilizing technology and systems; (C) adjusting the existing ways to comply with any previously applicable instructions and requirements; (D) searching data sources; (E) completing and reviewing the collection of information; and (F) transmitting, or otherwise disclosing the information."

TABLE 3: COSTS OF APPLYING REGISTRATION LAWS TO JUVENILES

COST TYPE	CALCULATED QUANTITY	UNIT VALUE (\$)	ANNUAL(\$M)	PRESENT VALUE (\$M)
On juvenile offenders (paperwork) ^a				
Registered juveniles (5%)	32,713	1,000	30	400
Registered juveniles (17%)	109,044	1,000	100	1,000
Registered juveniles (33%)	196,279	1,000	200	3,000
On juvenile offenders (family alienation) ^b				
On juvenile offenders (family alienation) ^b	0	0	0	0
On juvenile offenders (GPS monitoring) ^c				
On juvenile offenders (GPS monitoring) ^c	0	0	0	0
On juvenile offenders' families ^d				
Registered juveniles (5%)	65,426	3,000	200	2,000
Registered juveniles (17%)	218,088	3,000	700	9,000
Registered juveniles (33%)	392,558	3,000	1,000	20,000
On government (registry maintenance) ^e				
Registered juveniles (5%)	32,713	300	10	100
Registered juveniles (17%)	108,044	300	30	400
Registered juveniles (33%)	196,279	300	100	1,000
On government (foster care) ^f				
On government (foster care) ^f	0	0	0	0
On government (GPS monitoring) ^g				
On government (GPS monitoring) ^g	0	0	0	0
On innocent registrants ^h				
On innocent registrants ^h	0	0	0	0
COSTS OF REGISTRATION				
Registered juveniles (5%)			200	4,000
Registered juveniles (17%)			800	10,000
Registered juveniles (33%)			2,000	20,000
All values reported with one significant figure.				

a. Minor gap. No credible estimates in literature. Includes cost for registering and maintaining registration. Three alternative fractions of the proportion of registrants listed for juvenile offenses.

b. Minor gap. No credible estimates in literature. In some states, registration may trigger exclusion from living at home if victim is family member. Should be: "Not applicable if residential exclusion is a sanction independent of registration. Social cost is value of family alienation.

c. Minor gap. No credible estimates in literature. In some states, registration may trigger requirement for GPS monitoring. Direct cost to offenders is minor; indirect costs may be significant.

d. Major gap. No credible estimates in literature. Three alternative fractions of percent registrants listed for juvenile offenses. Family effects resulting from relational association assumed to be 3x paperwork burdens on offenders.

e. Minor gap. No credible estimates in literature. Cost is in-person paperwork processing. Three alternative fractions of % registrants listed for juvenile offenses.

f. Minor gap. No credible estimates in literature. In some states, registration may trigger exclusion from living at home if victim is family member. Not applicable if residential exclusion is a sanction independent of registration. Social costs are expenditures on administration and social work.

g. Minor gap. No credible estimates in literature. In some states, registration may trigger exclusion from living at home if victim is family member. Not applicable if residential exclusion is a sanction independent of registration. Social costs are expenditures on monitoring.

h. Major gap. No credible estimates in literature. Registrants not responsible for subsequent offenses are subject to heightened scrutiny. Scrutiny may lead to inadvertent or improper disclosure of registration status, with cost similar to those listed under Notification. Some innocent registrants may be falsely charged, and a few may be falsely convicted.

committed, even in the absence of registries.¹⁸ This means that when law enforcement agencies investigate registered offenders after a new sex offense is reported, contrary to television mythology, the vast majority of registrants they investigate (and quite likely, all of them) are innocent of the crime under investigation.

Nonetheless, heightened scrutiny is a real cost to innocent parties and must be counted. These costs obviously include innocent registrants' time and attention, as well as the opportunity cost of additional precautions they may take to reduce the likelihood of bearing the costs of heightened scrutiny. Some innocent registrants will have their registration status inadvertently or improperly disclosed to third parties, in which case they will suffer additional costs concomitant with public notification.

No estimates of these costs, or the precursor quantities needed to approximate them, have been located. This is considered a major gap in cost assessment and its magnitude is likely to be large in jurisdictions that aggressively use registries for law enforcement.

3. Net benefits

Table 4 presents the calculated net benefits of applying sex-offender registration laws to juveniles. Costs and benefits appear about equal if the proportion of registrants listed due to offenses committed as juveniles is 5 percent. For the higher modeled proportions (17 percent and 33 percent), registration has negative net benefits of \$800 million and \$1 billion per year, respectively.

TABLE 4: NET BENEFITS OF APPLYING REGISTRATION LAWS TO JUVENILES

Net benefits	Annual (\$M)	Present value (\$M)
Registered juveniles (5%) ^a	0	-2,000
Registered juveniles (17%) ^b	-600	-9,000
Registered juveniles (33%) ^c	-2,000	-20,000
All values reported with one significant figure.		

a. 5 percent of registrants listed for juvenile offenses.

b. 17 percent of registrants listed for juvenile offenses

c. 33 percent of registrants listed for juvenile offenses

Figure 1 graphically illustrates benefits and costs of registration in present-value terms using a 7 percent discount rate and an infinite time horizon. Figure 2 displays net benefits of registration the same way.

18. Sandler, Freeman and Socia (2008).

4. Sensitivity analysis

While there is uncertainty about the unit value of preventing a forcible sex offense, the effect of this uncertainty on net benefits is likely to be relatively small compared to uncertainties in the calculation of social costs.

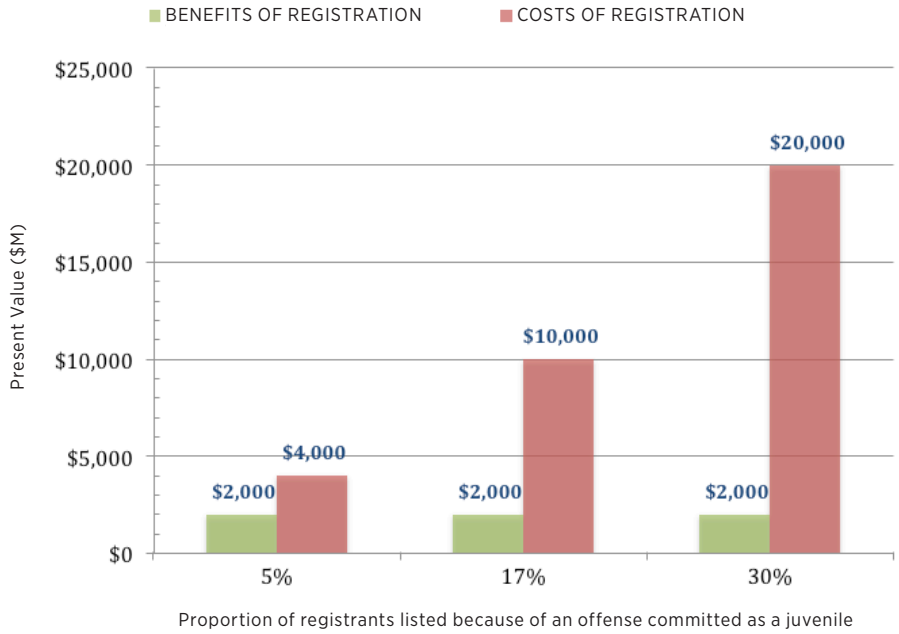
On the cost side, the most important uncertain parameters are the extent to which registration reduces incidence and the proportion of registrants listed due to offenses committed as juveniles. The analysis models a range of proportions from 5 percent to 33 percent. The lower value appears to be a plausible lower bound, but locating an equally plausible upper bound is not simple. Still, it is easy to modify the cost model to incorporate a higher percentage if there is better evidence supporting its plausibility.

Reduction in incidence: Assuming for the sake of argument that costs have been accurately estimated, net benefits are sensitive to the degree to which registration reduces incidence. The estimate obtained by Prescott and Rockoff (2011) is used here because it is the only analysis that uses higher-quality National Incident-Based Reporting System data; the capacity to discern effects across offender/victim relationships; and has sufficient statistical power to detect relatively small changes. Obviously, other values are plausible, but in the absence of any evidence supporting specific alternatives, no other estimates are modeled.

The proportion of registrants listed due to offenses committed as juveniles: Assuming for the sake of argument that benefits have been accurately estimated, registration is unlikely to produce positive net benefits unless the proportion of registrants listed due to offenses committed as juveniles is less than 5 percent. Coincidentally, this is a plausible lower bound for this proportion. For the lower bound to be true, there must be no significant migration of juvenile offenders from non-public to public registries, and juveniles must not be listed for more than an average of 10 years. If the average term is longer, or juvenile offenders migrate in significant numbers from non-public to public registries, then 5 percent is not a valid lower bound for the true proportion and net benefits are increasingly likely to be negative.

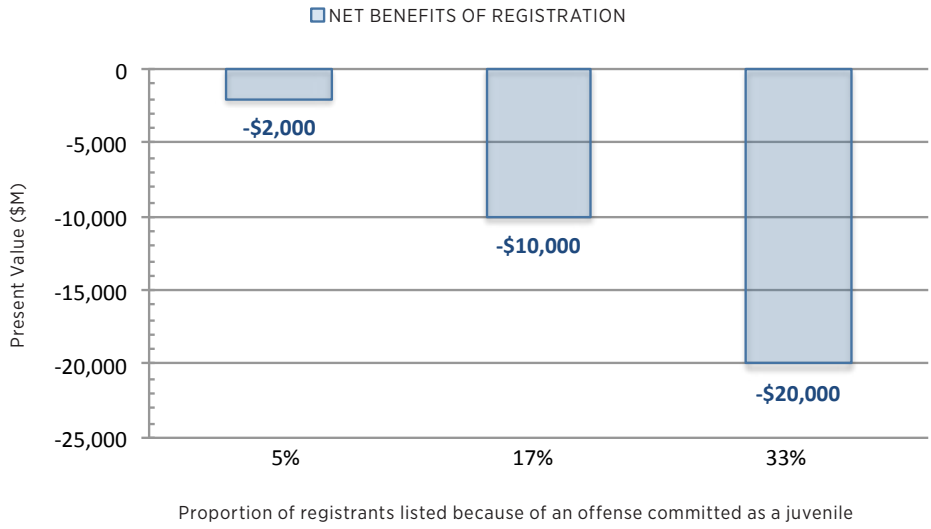
A useful sensitivity benchmark is the incidence reduction that results in zero net benefits at the middle (17 percent) and higher (33 percent) fractions of registrants assumed to be listed due to offenses committed as juveniles. At both of these proportions, net benefits are substantially negative. If the middle proportion is assumed to be true, registration would have to reduce incidence by at least 60 percent to yield positive net benefits. For the high proportion, registration would have to reduce incidence by about 80 percent. Incidence reductions of these magnitudes have not been observed anywhere, or even suggested by committed registration advocates.

FIGURE 1: PRESENT VALUE BENEFITS AND COSTS OF APPLYING REGISTRATION LAWS TO JUVENILES



All values reported with one significant figure. Assumed proportion of public registrants comprised of persons listed due to offenses committed as juveniles: Low = 5 percent, Mid = 17 percent, High = 33 percent.

FIGURE 2: PRESENT VALUE NET BENEFITS OF APPLYING REGISTRATION LAWS TO JUVENILES



All values reported with one significant figure. Assumed proportion of public registrants comprised of persons listed due to offenses committed as juveniles: Low = 5 percent, Mid = 17 percent, High = 33 percent.

Costs to offenders: Net benefits also are sensitive to the magnitude of burden borne by offenders and their families. In this analysis it is assumed that family burdens are six times greater than burdens on offenders, reflecting broad familial spillover effects on family members and the higher marginal-value product of parents' time. These burdens would be lower if offenders and their families are estranged for reasons other than registration. However, they would be higher if offenders' parents are highly engaged with their children; have higher educational attainment; and the higher income that tends to accompany higher educational attainment.

Value of preventing a statistically random violent sex offense: Net benefits also are sensitive to the assumed value of preventing a statistically random violent sex offense. The figure used here—\$209,000— is adapted from the most comprehensive estimate in the literature. The estimate acknowledges gaps where important costs could not be estimated. Ideally, this unit value would be the sum of different sex offenses weighted by their unit of prevention value. The available literature does not support developing an estimate that captures this kind of detail.

Some insight can be gleaned by calculating net benefits for a range of unit values. These calculations are simple proportions of the reported benefit estimate. For example, if the true unit value is half as large, the benefits of registration decline by half and net benefits become highly negative under all models. If the true value is double the amount used here, benefits would be twice as large and net benefits would be positive if the proportion of registrants listed due to offenses committed as juveniles is 5 percent.

E. Public notification

Notification expands without limit the population that may become aware of a juvenile offender's registration status. Substantial costs are likely to be associated with the dissemination of this information. Ironically, costs imposed on the intended beneficiaries are even greater than costs imposed on the offenders.

Meanwhile, benefits are difficult to find, even in theory.

I. Benefits

The primary benefit that legislators appeared to expect when enacting sex-offender registration laws was deterrence of future sex offenses. The mechanism by which this was expected occur is simple to explain, but complex to realize. For several reasons, this mechanism is highly unlikely to work.

Using the public registry is difficult. Individuals must consult it frequently and manually. Data change as new sex offenders

are listed and existing offenders change schools, jobs and residences. Searches must be performed manually, as the public Web interface is protected from automated algorithms to search for and distribute results. Registries are searchable by name, ZIP code and address radius; the latter two are the more common search strategies for community members. ZIP code boundaries are large and one mile is the smallest search radius permitted. Searches are cumbersome, yield data that are difficult to use and include numerous errors that misinform the public. Some search results are inaccurate or misleading. Some addresses are plotted incorrectly. Registrants who are known to be homeless, or who have no known fixed address, are given random but specific map locations.¹⁹

Considering these design limitations, the utility of registry information is suspect, even before a public user begins to consider what additional precautions might be warranted. This leads to an even greater barrier to effectiveness. A review of the literature does not reveal any plausible risk-reducing actions or strategies a member of the public could take to reduce risk based on information listed in the public registry.

Public notification may have benefits in specific cases where community knowledge of registered offenders expedites apprehension of a recidivist. There is evidence in the literature that this may occur, but it is less susceptible to quantification and monetization than the burdens regularly imposed by registration on innocent registrants, who are subject to heightened law-enforcement scrutiny. Public notification also may increase the perception of safety if the actual number of (and proximity to) registered sex offenders is materially below public perceptions. This could lead the public to reduce expenditures on cost-ineffective precautionary measures and these cost savings would be cognizable as benefits. (Of course, notification could have the opposite effect on public risk perception, in which case its effects would be realized as costs.)

This suggests that public benefits from notification may be limited to existence value and voyeur value. Existence value is the intrinsic value of a good, service or amenity

19. The author's state registry allows searches by ZIP Code, address, name, county and city. For the author's residential ZIP Code, search yielded 62 non-incarcerated offenders, reported on a map or list. The map does not include ZIP Code boundaries, so users typically would be unable to discern their distance from an adjacent ZIP Code. A search including adjacent (but unspecified) ZIP Codes yields 134 offenders. City searches capture post office addresses, not jurisdictional boundaries. A search for "Alexandria, Va." yields 290 offenders, a majority of whom appear to live or work in Fairfax County, Va., rather than in the City of Alexandria.

Lists are alphabetical by last name and cannot be sorted by any useful field (e.g., street address). Offense type is not a disclosed field.

Map view purportedly allows the user to distinguish between residential and employment listings, but most employment-based listings erroneously show residential addresses. Radius searches produce only maps. A one-mile radius search produces nine employment and 31 home locations; numbers must be manually counted, and some work or home icons include multiple offenders.

independent of any willingness to pay for consumption, use or other enjoyment. Voyeur value is the willingness to pay to observe or vicariously experience the macabre. Existence value is generally accepted conceptually in economics, though often controversial in practice, especially in the absence of more conventional benefits. Voyeur value is often observed in practice (e.g., public interest in graphic images of catastrophic events, rubbernecking and so-called “reality” television). But including it here as a benefit raises ethical issues, because the purported benefit is always at others’ expense and, perversely, would *increase* with the size of a registry. In any case, there are no credible estimates of the magnitudes of these purported benefits.

Table 5 lists each of the categories of potential benefits of applying notification laws to juvenile sex offenders. There is no credible evidence that notification leads to a reduction in incidence, so the calculated value of sex offenses prevented is zero. This does not mean that no such benefits exist. Rather, it means that, if notification does reduce incidence, the effect is too small to detect using sophisticated statistical methods. Support for the absence of incidence reduction is provided by the weakness of the causal chain through which such benefits would be realized, as noted above. None of the other categories of potential benefits is likely to be significant even if it could be estimated.

TABLE 5: BENEFITS OF APPLYING SEX-OFFENDER-NOTIFICATION LAWS TO JUVENILES

Benefit type	Calculated quantity	Unit value	Annual (\$M)	Present value (\$M)
Prevented sex offenses ^a	0	\$209,000	0	0
Existence value/voyeurism? ^b	0	0	0	0
To law enforcement ^c	0	0	0	0
Neighborhood indirect cost savings ^d	0	0	0	0
BENEFITS	0	0	0	0

a. No evidence of deterrent effect in literature. Causal pathway is complex, requiring, inter alia, public use of registries, understanding of data and actions based on data that reduce incidence.

b. Minor gap. No credible estimates in literature. Public may be willing to pay to know registries exist and can be accessed, even if they do not use them. Public use may be dominated by voyeurism, which for public policy reasons might be excludable from the domain of public benefits.

c. Minor gap. There is credible evidence in literature that notification reduces time to arrest. Effects are not quantified in a way amenable to valuation.

d. Minor gap. No credible estimates in literature. Benefits are speculative, requiring pre-notification risk expectations to be substantially above actual risk. (New indirect costs where notification increases risk perception must be subtracted.)

2. Costs

Table 6 summarizes the costs of applying notification laws to juvenile sex offenders. These costs are numerous in type and substantial in magnitude.

Costs to registered sex offenders and their families: The most obvious cost of notification is a reduction in employment opportunity. Many employers will decline to hire offenders, either for risk-management purposes or to comply with labor-market regulations. They may terminate current employees if it can be done without triggering criminal or civil liability. Reliable estimates of the magnitude of these costs are elusive, in large part because employers are reasonably disinclined to disclose relevant data. No quantitative studies of employment effects, on either the supply or the demand side of the labor market, have been located. For purposes of this analysis, it is assumed that juvenile offenders face a 50 percent reduction in employment as a result of notification. Multiplying by the average annual wages for those with less than a high-school education (\$25,376 in 2015)²⁰ yields an aggregate annual cost of \$400 million to \$2 billion, depending on the proportion of registrants listed due to offenses committed as juveniles.

The costs of unemployment will be experienced by both offenders and their families. Families that are not estranged from juvenile offenders are also likely to bear additional income losses, independent of the income losses offenders experience, due to their familial association. As a placeholder, absent better information, the value of these losses is assumed to be half as great as the value of income losses experienced by offenders directly. This yields calculated aggregate annual costs to families of \$200 million to \$1 billion per year.

Costs to homeowners: The lion’s share of costs from notification is, ironically, borne by the same people the process is supposed to benefit: neighbors. Like other locational attributes of housing (e.g., the quality of an assigned elementary school), the value of locational disamenities also is capitalized in the value of residential real estate. While it may be intuitively obvious that one’s neighbors affect property values, it historically has not been possible to measure neighbor “quality.” The establishment of publicly available sex-offender registries changed this, at least with respect to this particular type of neighbor.

The best available estimates in the literature found 2.5 percent and 3.7 percent declines in the value of homes located within 0.1 mile of a registered sex offender.²¹ The higher

20. Bureau of Labor Statistics (2015).

21. Linden and Rockoff (2008) and Pope (2008).

figure yields a calculated loss per offender of \$160,000.²² Losses disappeared when an offender moved away, effectively cementing causality.²³ These costs range from \$5 billion to \$30 billion per year, depending on the proportion of registrants listed due to offenses committed as juveniles. Note that these costs do not reflect the value of actually preventing sex offenses, whether committed by a registered offender or anyone else. This cost is strictly a disamenity value, as the market measures it, for living within 0.1 mile of a registered sex offender.

To be sure, these costs generally would be realized when only if a homeowner decides to sell. There are other ways disamenity value could be realized, however. For example, a homeowner who sought to refinance would receive an appraised value a few percentage points below expectations. Some homeowners could be denied refinancing, or only allowed to refinance a smaller amount, depending on their equity. Whether this happens in any individual case depends greatly on what home appraisers deem to be appropriate comparable properties. Finally, homes beyond 0.1 mile, and thus outside the affected zone, also could be appraised at lower values, if homes within that radius were used as comps.

For benefit-cost analysis, it does not matter whether benefits are known or costs are realized. A policy that reduced juvenile sex offenses by half, but which was not generally recognized as having accomplishing anything, nevertheless would produce substantial social benefits. A policy that imposes costs that no one sees still imposes costs.

Costs to renters and landlords: In neighborhoods where most people rent, and especially *in* neighborhoods that consist of multifamily housing, the disamenity value of co-location with a registered sex offender would be borne different ways by tenants and landlords. For tenants, the amount they are willing to pay in rent would decline if they are co-located near a registered sex offender, quite possibly by a lot. Many renters not accommodated with lower rents would choose to move. For landlords, lower rents reduce the market value of the rental property. Renters bear these costs only if they are, for whatever reason, unable to negotiate lower rents or cannot move.

This leads to an important insight. Landlords need not have any animus toward registered offenders, nor need they have an altruistic interest in their renters' welfare, to be highly motivated to exclude registered sex offenders as renters. Property value losses alone are sufficient to explain this behavior.

22. Linden and Rockoff (2008), p. 1116: \$60 million in losses divided by 373 offenders yields \$160k per offender. A similar calculation cannot be readily performed from Pope (2008).

23. Pope (2008).

Costs to businesses: Businesses expend resources utilizing online registries to collect information about registered sex offenders who apply for jobs or who already work for them. They would not bear these costs if the registry were non-public. Search costs are calculated by multiplying the number of annual searches of the federal registry (2.4 billion) by the proportion (30 percent) of searches that are direct to the registry (i.e., not via a search engine); the average number of hours (0.05) spent per search; and the value of employer time (\$100/hour).²⁴ Aggregate search cost is calculated at \$3 billion per year.

Employers who perform searches of current employees face a difficult decision if they get positive information. In many states, it is a violation of labor law to terminate an employee based on sex-offender registration. On the other hand, if they do not terminate an employee-registrant, they risk litigation from other employees alleging a hostile work environment. Estimates of these costs have not been located in the literature and constitute a major gap in the cost analysis. What employers actually do is probably very difficult to learn for a number of reasons, including their reasonable disinclination to reveal the information.

Costs to schools: Schools have additional responsibilities to utilize and respond to registry data. No credible estimates of this cost have been located in the literature. The cost analysis assumes that schools expend \$1,000 per offender to adapt to their presence, mitigate any real or perceived risks they pose, and manage relations with other students. In any one year, costs are borne only for those juveniles contemporaneously arrested for sex offenses, so aggregate costs to schools are calculated at \$7 million per year.

Costs to the public: Search costs borne by the public are calculated in a similar fashion as business search costs. The proportion of searches assigned to the public is higher (70 percent), based on the fraction of searches reaching the federal registry through a referral or search engine. The value of time is assumed to be \$30/hour. Aggregate cost to the public from searches is calculated at \$200 million to \$1 billion, depending on the proportion of registrants listed due to offenses committed as juveniles.

Unquantified costs: Probably the most important unquantified costs are the costs of underreporting and the opportunity cost of precautions taken by the public in response to registry information learned through public notification. The largest category of juvenile sex offenses is offenses committed against family members. As it becomes more widely understood that family members bear substantial costs when they report offenses, it becomes entirely rational to choose

24. The number of searches of the federal registry is multiplied by 1.5 to account for the 20 states that maintain their own registries.

TABLE 6: COSTS OF APPLYING SEX-OFFENDER-NOTIFICATION LAWS TO JUVENILES

COST TYPE	CALCULATED QUANTITY	UNIT VALUE (\$)	ANNUAL (\$M)	PRESENT VALUE (\$M)
On juvenile offenders (lost income) ^a				
Registered juveniles (5%)	32,713	12,688	400	6,000
Registered juveniles (17%)	109,044	12,688	1,000	20,000
Registered juveniles (33%)	196,279	12,688	2,000	40,000
ON JUVENILE OFFENDERS' FAMILIES (LOST INCOME INDEPENDENT OF OFFENDERS) ^b				
Registered juveniles (5%)	65,476	6,344	200	3,000
Registered Juveniles (17%)	109,044	6,344	700	10,000
Registered juveniles (33%)	196,279	6,344	1,000	20,000
On neighbors (lost property value) ^c				
Registered juveniles (5%)	32,713	160,000	5,000	70,000
Registered Juveniles (17%)	109,044	160,000	20,000	200,000
Registered Juveniles (33%)	196,279	160,000	30,000	400,000
ON EMPLOYERS				
Registry searches ^d	1,058,907,459	3	3,000	50,000
Adaptation/mitigation) ^e				
Registered Juveniles (5%)	32,713	2,538	100	1,000
Registered Juveniles (17%)	109,044	2,538	300	4,000
Registered Juveniles (33%)	196,279	2,538	500	7,000
ON SCHOOLS				
Adaptation/mitigation) ^f	7,000	1,000	7	100
Registry searches ^g	7,000	10	0.07	1
On public				
Registry searches ^h				
Registered Juveniles (5%)	123,655,870	2	200	3,000
Registered Juveniles (17%)	412,186,234	2	500	9,000
Registered Juveniles (33%)	741,935,221	2	1,000	20,000
UNDERREPORTING OF OFFENSES ⁱ				
Additional precaution ^j	0	0	0	0
On the criminal justice system ^k				
COSTS OF NOTIFICATION				
Registered Juveniles (5%)	0	0	10,000	100,000
Registered Juveniles (17%)	0	0	30,000	400,000
Registered Juveniles (33%)	0	0	40,000	500,000

All values reported with one significant figure.

- a. Major gap. No credible estimates in literature. Calculations provided for 50 percent and 100 percent lost income. Unit value is annual wage of non-HS graduate from BLS (2015).
- b. Major gap. No credible estimates in literature. Family income loss assumed to be 50 percent of offender income loss. Result is insensitive to choice of percentage.
- c. Unit value per offender from Linden (2008).
- d. 30 percent of federal registry searches (covering 30 states) multiplied by 30/20. Assumes unit search cost = \$3.
- e. Major gap. Assumes 50 percent of registrants listed for juvenile offenders are employed; matches income loss assumption; and adaptation/mitigation costs 10 percent of wages. For current employees, any action could lead to civil liability. For prospective employees, rejection is fairly simple, even if prohibited by law.
- f. Costs of isolating/supervising. Monitoring offender-students. Assumes schools must adapt/mitigate for all registered juveniles arrested during current year. Separate from employer costs.
- g. Assumes schools conduct searches for all registered juveniles arrested during current year.
- h. 70 percent of federal registry searches (covering 30 states) multiplied by 30/20; Assumes unit search cost = \$3.
- i. Major gap. No credible estimates in literature. Because families bear financial consequences of offenders' reduced educational and employment opportunities, substantial underreporting of family-related offenses is likely.
- j. Minor gap. No credible estimates in literature. Type and frequency of additional precautionary actions taken in response to registry information are unknown. These costs exist even if benefits equal zero. If benefits exist, these costs are likely to be substantial. Only the fraction attributable to juvenile sex offenders is counted, making the aggregate amount small.
- k. Minor gap. No credible estimates in literature. Cost consists of operating the online registry.

not to report all but the most heinous offenses. Only anecdotal information is available concerning the opportunity costs of notification-induced precaution. This cost is not quantified; it was not quantified for registration, and any cost estimate would have to be disentangled between registration and notification.

A second unquantified cost is the value of additional precautions taken by the public in response to publicly available registry information. The type, frequency and unit cost of precautionary actions taken in response to registry data are all unknown. Nonetheless, these costs could be substantial, especially when notification reveals that a sex offender lives very close. As a thought experiment, assume that only those single-family homeowners who suffer disamenity value from living near registered sex offenders also expend nontrivial resources trying to reduce risk—or, what is empirically the same, thing, trying to reduce the magnitude of the disamenity value. For every 1 percent of disamenity value these households expend in response to registry data, aggregate annual cost would range from \$50 million to \$300 million per year, depending on the proportion of registrants listed due to offenses committed as juveniles. Households may well be willing to spend \$1,600 to reduce risk or attempt to mitigate a much larger disamenity value. These costs could be much greater for households living in multifamily housing. Just the cost of moving could be this large.

Aggregate social costs: When quantifiable costs are summed, they range from \$10 billion to \$40 billion per year, depending on the proportion of registrants listed due to offenses committed as juveniles. About half of these costs consist of property value losses to those who live within 0.1 mile of a registered offender. Recall that these costs are not related to the risk of being victimized by a recidivist offender; this is a disamenity value associated with living near an offender, independent of any action the offender might take.

3. Net Benefits

Because no credible benefits can be identified, notification laws appear to produce only costs.

Table 7 presents the net benefits of applying notification laws to juvenile sex offenders. Because the best point estimate of benefits is zero, net benefits are -\$10 billion to -\$40 billion per year.

TABLE 7: NET BENEFITS OF APPLYING SEX OFFENDER NOTIFICATION LAWS TO REGISTERED JUVENILES

Net Benefits	Annual (\$M)	Present value (\$M)
Registered juveniles (5%)	-10,000	-100,000
Registered juveniles (17%)	-30,000	-400,000
Registered juveniles (33%)	-40,000	-600,000

All values reported with one significant figure.

4. Sensitivity Analysis

No sensitivity analysis is needed with respect to benefits; the best estimate of benefits is zero, and even if benefits exist, they likely would be minor. Aggregate social cost is sensitive to a small number of parameters, the uncertainty of which could be reduced with additional research.

Costs to neighbors of the disamenity value of living near registered sex offenders: Economic theory and lay intuition both support the empirical evidence that living near registered sex offenders is a disamenity that people will pay substantial amounts to avoid. Two well-conducted hedonic studies (Linden and Rockoff 2008; Pope 2008) have been performed to estimate the magnitude of disamenity value and they obtained strikingly similar results. One of the studies (Pope 2008) was able to demonstrate that the disamenity value disappeared when offenders moved away, which offers strong evidence of causality.

Nonetheless, the magnitude of disamenity depends on whether these results can be extrapolated nationwide. Arguing in favor of extrapolation is that communities studied were fairly typical; that they are located in different states; and that, as previously noted, similar results were obtained. Arguing against extrapolation is that there are just two hedonic property valuation studies and that nationwide variation in housing prices and locational factors is much greater than seen in these two communities. Average home prices there were \$144,000 and \$172,000, less than the contemporaneous nationwide median purchase price and much less than values found in major metropolitan areas. The extrapolation performed here does not adjust for the range in property values in the United States, thus failing to account for higher valued property elsewhere.

The cost analysis also assumes the disamenity value is proportional to price and not composed of both fixed and variable effects. Performing additional hedonic studies, most notably studies in communities with heterogeneous housing, would be necessary to develop a more refined extrapolation procedure.

Costs to offenders from reduced employment opportunities:
Costs to offenders of reduced employment opportunity are

sensitive to the wage rate that registered offenders otherwise would earn and the proportion of them who are rendered unemployed (and perhaps minimally employable). Using the wage rate for non-high school graduates may make sense for juvenile offenders, given the available evidence on their typical socioeconomic status, but it has important limits. For example, it understates income losses to juvenile offenders who otherwise would have been expected to earn post-secondary degrees.

To illustrate the possible effects of this assumption, costs were calculated using the alternative assumption that income losses were twice as high (i.e., ~\$51k). Calculated income lost by offenders increases from a range of \$200 million to \$1 billion per year to a range of \$400 million to \$2 billion. These are obviously large proportional increases, but they are swamped by the range of costs from disamenity value (\$5 to 30 billion).

Costs from underreporting: The literature offers little insight about the social cost of underreporting, but the frequency with which underreporting is said to be a serious problem argues persuasively that it is a material component of a comprehensive cost analysis, especially for notification. There are numerous anecdotes in the popular press about juveniles unexpectedly caught up in registration and notification regimes, and as a result, having substantial difficulty securing steady employment. As awareness spreads about how this happens, the number of sex offenses that go unreported should be expected to increase. Additional research is needed to estimate the extent to which notification increases underreporting, and whether any such increase depends on the type of offense or the identity of the victim.

SECTION IV: PROSPECTIVE BENEFIT-COST ANALYSIS

The retrospective benefit-cost analysis indicates that registration alone is unlikely to produce net social benefits. Costs to offenders registered due to offenses committed as juvenile are limited to paperwork burdens which, though nontrivial, do not directly impede social reintegration. Benefits consist of the proportion of deterrence attributable to sex offenses not committed by juvenile offenders and each sex crime deterred has high social value.

However, the analysis also shows that public notification is almost certainly a highly cost-ineffective way to reduce future sex offenses. No evidence has been found indicating that there are any social benefits. Thus, reform of notification laws appears to be the most plausible class of reform alternative that warrants consideration from an economic-efficiency perspective.

A. Important caveats regarding reform

All reforms are limited in what they can achieve, because they can't reverse what already has occurred. Moreover, affirmative information-disclosure policies only can be promulgated once. Information that has been disclosed cannot be made confidential retrospectively. Finally, because information disclosure is directly affected by technological change, the advance of information technology presents a special hurdle in the production of social benefits from reform.

B. The principle of sunk costs

Financial resources expended to comply with the AWA and its predecessors obviously can't be recovered. Most obviously, this includes the fixed costs of establishing the state and federal registries. Less obviously, perhaps, is that the presumably unintended, long-term costs on offender employment and neighborhood property values also can't easily be reversed. If all juvenile offenders were summarily exempt from public notification and eliminated from online searches of state and federal registries, prior notifications would not automatically be "forgotten." The sunk cost of notification would diminish over time at no faster than the half-life of collective human memory.

The extent to which these sunk costs actually are "sunk" depends on the mechanism by which the costs are transmitted to the market. For example, if prospective employers rely only on the current registry and lack access to or ignore historical registration status, then removal from the registry—or more precisely, from public notification of registry status—allows benefits to begin accruing immediately. Similarly, if the disamenity capitalized into property value reflects only the current registry, then removal from the registry may cause the disamenity value to disappear. Additional research is required to sort out these timing questions.

C. Technological advancements reduce potential benefits of reform

The ubiquity of the Internet means that, however short the half-life of human memory might be, its capacity to be refreshed at low cost is virtually unlimited. Thus, constitutional and statutory rights to privacy are increasingly theoretical in character; attempting to protect privacy in the age of the Internet may have the ironic effect of creating celebrities out of those who want to be recluses.²⁵ Even the concept of privacy rights has taken on an otherworldly character with

25. Mario Costeja González sued *La Vanguardia Ediciones SL* and Google because searches of his name revealed "links to two pages of *La Vanguardia's* newspaper, of January and March 1998 ... contain[ing] an announcement for a real-estate auction organised following attachment proceedings for the recovery of social security debts owed by Mr. Costeja González" even though those proceedings had been resolved. See Court of Justice of the European Union (2014). The plaintiff prevailed in law, but the opinion delivered in his favor made the whole world knowledgeable of the very facts he sought to suppress in Catalonia.

the advent of social media, which by its very design requires users to substantially relinquish privacy rights. Worries about government surveillance of this information abound,²⁶ but the mere presence of information in the public domain means that the costs to juvenile offenders of public notification are, for all practical purposes, already sunk. Nearly all benefits from reform will accrue from the non-registration or nondisclosure of registry status of new juvenile offenders.

D. Reform alternatives warranting consideration on economic-efficiency grounds

Retrospective benefit-cost analysis places the burden on the government to show that the benefits of registration or notification exceed the costs. This reflects best practice in the field. Due to the unique coercive power of government, the absence of evidence of net social benefits that would result from government action should be construed as support for the *status quo ante* regulation.

Prospective benefit-cost analysis proceeds differently. The status quo is not the unregulated state but one in which the annual flows of benefits and costs identified in the retrospective analysis continue without limit. Therefore, the identity of benefits and costs are reversed; what counted as a benefit in retrospective analysis is a cost of reform, and what counted as a cost is now a benefit if it can be avoided.

In a similar vein, the cost of establishing state registries is now sunk. Immediately after the AWA's enactment, a credible case could be made that the costs to the states of constructing federally compliant registries exceeded the value of lost Byrne grant transfer payments.²⁷ But these costs are now sunk, making it much less likely that it is in a state's financial interest to accept the cost of lost Byrne grant payments in return for the benefit of restored state sovereignty over juvenile sex-offender policy.²⁸

The first subsection below discusses a reform alternative that is not inconsistent with the AWA, thus posing no credible risk of losing Byrne-grant transfer payments. The second subsection discusses reform alternatives that likely are inconsistent. Whether the Department of Justice would act in accordance with its authority to cut Byrne-grant funding, or whether a state has other tools to prevent such an action,

is beyond the scope of this analysis. The discussion assumes that no cuts would in fact occur or that a state has independently decided that the benefit of restored state sovereignty outweighs the cost of the lost transfer payments.

I. Reforms consistent with the AWA

The principle reform alternative is prosecutorial discretion. Given the dearth of juveniles on public registries, it appears that this is standard practice in most (or perhaps all) states. The largest fraction of juveniles on any state registry found by Ackerman, et al., (2011) was 2 percent (i.e., between 1.50 percent and 2.49 percent). This suggests that nearly all juvenile sex offenders currently are directed away from the registration and notification systems. Studies performed in South Carolina²⁹ and Massachusetts³⁰ indicate this is commonplace in those states. The extent to which other states share this practice remains to be determined by future research.

Prosecutors have always had, and the AWA did nothing to impede, the option of charging juveniles in adult courts. It cannot be discerned how often this occurs, and registration and notification laws do not appear to have any theoretically predicted incentive effect on this choice. Thus, no qualitative prediction can be offered concerning the effect of a shift in the use of adult courts—in either direction—on social benefits and costs.

2. Reforms that likely result in noncompliance with the AWA

The alternatives discussed below are assumed to result in at least potential noncompliance with the AWA. Whether such conflicts would, in fact, occur depends on state law. Future research must be performed to determine if these reforms can be achieved without violating the AWA.

Exempting from notification different groups of offenders registered due to offenses committed as juveniles : A review of the various tools used to assess sex-offense recidivism risk is beyond the scope of this analysis. Nonetheless, risk assessment remains, in principle, a near-universally approved approach to risk management. A crude and arbitrary form of risk assessment is prescribed in the AWA for determining the length of registration and the frequency of updates; more sophisticated forms of risk assessment are key elements of the clinical treatment of juvenile offenders. States are free to devise and apply their own risk-assessment methods.

Creating or expanding the domain of exempt offenders would have benefits and costs of similar type, but different magnitude. Benefits would be proportionate to the number

26. See, e.g., Semitsu (2011).

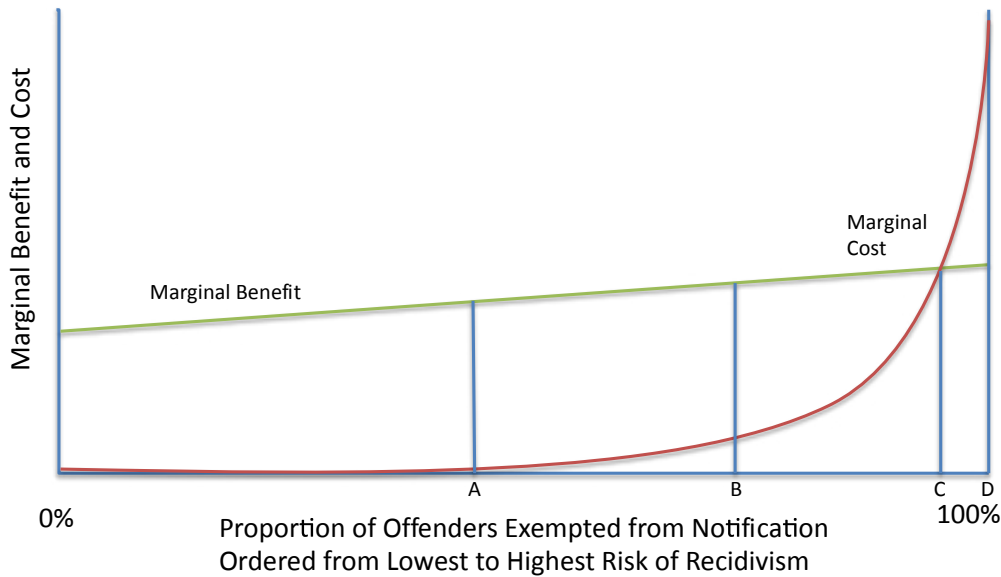
27. The Justice Policy Institute (2008) alleged that the states' cost of implementing the AWA vastly exceeded the value of Byrne-grant funds lost from noncompliance. The method used to derive state costs was fairly primitive. More recent reports have reached similar qualitative conclusions, but methodological questions remain. See, e.g., Scott (2011).

28. Byrne-grant funds were about \$200 million in 2009 (Justice Policy Institute (2008)), rising to about \$375 million in 2015 (Catalog of Federal Domestic Assistance (2015)). If all states decided to walk away from adherence to AWA registration and notification provisions, they would collectively lose less than \$40 million per year. Nonetheless, this is much less than the likely annual costs to state governments of maintaining their registries.

29. Letourneau, Armstrong, Bandyopadhyay and Sinha (2012).

30. Wright (2008), discussing results of his unpublished doctoral dissertation.

FIGURE 3: EXEMPTING JUVENILE SEX OFFENDERS FROM NOTIFICATION



of offenders exempted. Social costs would be negligible for most juvenile offenders but considerable for a few.

Figure 3 displays these concepts graphically, showing the marginal benefits and costs of exempting different fractions of offenders from notification requirements. It is assumed that offenders can be ranked, at least in groups, from lowest to highest risk of sex-offense recidivism. The marginal benefit of exemption is likely to rise slowly as the fraction exempted approaches 100 percent. Notification imposes essentially fixed costs on offenders, their families and their neighbors. However, notification imposes a combination of fixed and variable costs on others, such as schools and employers, depending on sex-offense recidivism risk. The elimination of these costs is the social benefit of exemption. The marginal cost of exemption depends almost entirely on sex offense recidivism risk. While this risk appears to be low for most juveniles, it is substantial for a small cohort.³¹ The marginal social cost of exemption thus begins very close to zero and rises slowly over the majority of offenders. In the diagram, sex offense recidivism risk is portrayed as a geometrically rising function.

Consider A, B, C and D as alternative fractions of juvenile offenders exempted from registration, where D is equivalent to simply eliminating the notification requirement for juveniles. Fractions A and B have marginal benefits substantially greater than marginal costs, so both of them offer net social benefits. Fraction C is the unique point where marginal benefit and marginal cost are equal, the economically efficient

exemption fraction. For every juvenile offender located to the right of C, however, the marginal cost of exemption exceeds marginal benefit. Unless the marginal cost curve reaches 100 percent of the juvenile-offender population below the marginal benefit curve, exempting all juvenile offenders is inefficient. This conforms to both intuition and empirical evidence: some juveniles pose a substantial risk of sex-offense recidivism, and the social costs of the sex crimes they would not have committed if they were subject to notification must be counted against a 100 percent exemption policy.³²

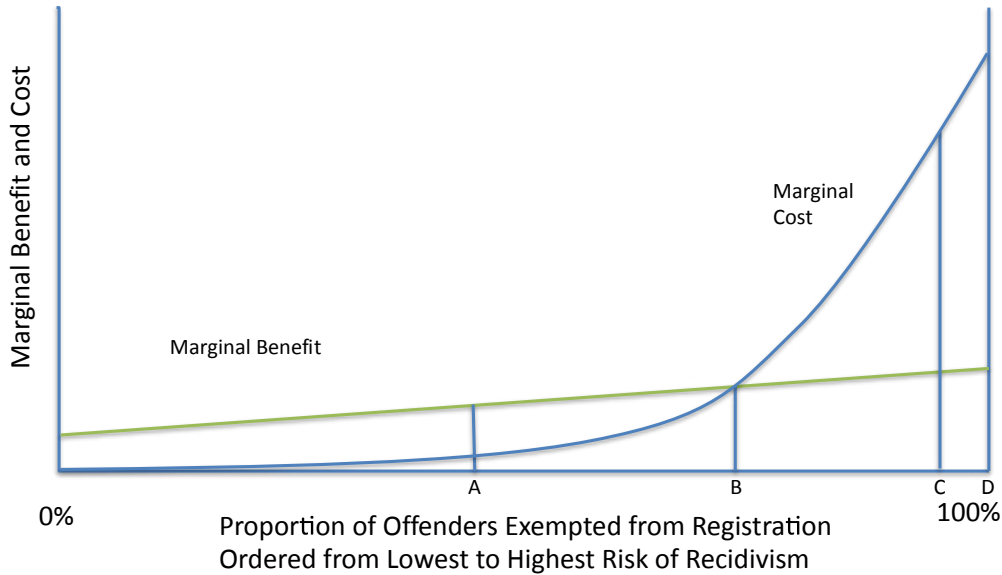
Exempting from registration different groups of offenders registered due to offenses committed as juveniles: This array of alternatives follows along a similar trajectory. The marginal benefit to offenders is essentially constant, but it likely has both fixed and variable components for others. However, because the marginal cost of notification is substantially higher than the marginal cost of registration, at all exemption fractions, marginal benefit is lower for registration exemptions than notification exemptions. The marginal cost of exempting juveniles from registration is low for low-risk juveniles but rises as sex-offense recidivism risk increases.

These concepts are displayed in Figure 4. Marginal benefit and marginal cost curves have the same general shape as in Figure 3. Registration exemption fractions A, B, C and D from Figure 3 are plotted. As in the case of notification exemption,

31. Tewksbury and Jennings (2010), Tewksbury, Jennings and Zgoba (2012).

32. The way Figure 3 is drawn presupposes that notification would have social benefits if it were focused on the highest risk registered offender. This is consistent with the view that overly inclusive notification schemes dilute public attention away from offenders who pose the highest risk of reoffending.

FIGURE 4: EXEMPTING JUVENILE SEX OFFENDERS FROM REGISTRATION



marginal benefits exceed marginal costs for fraction A. The marginal-cost curve is drawn so that the economically efficient exemption fraction is B, and fractions C (the optimum notification exemption fraction) and D both yield negative net benefits. This is mathematical; the optimal fraction exempted from notification cannot be less than the optimal fraction exempted from registration.

Terminate the registration of offenders registered due to offenses committed as juveniles if they would not be required to register had they committed their offenses today: Two decades of longitudinal data are now available. It is certainly plausible that relatively low-risk juvenile offenders today are processed more leniently than their predecessors 10 or 20 years ago. If analysis were to show this to be true, a case could be made for terminating the registration of offenders who years ago were placed on the registry for offenses that today would lead to reclassification or other outcomes that don't lead to registration.

The economic efficiency case for this alternative is similar to other exemption proposals. In addition, there is an equity argument that historic offenders (and the neighborhoods in which they live) should be relieved of burdens that would not be imposed under the same circumstances today.

Stay notification pending future good conduct: An alternative to exempting certain categories of juvenile offenders would be to stay notification pending some future adverse event. This event could be positive (e.g., successful completion of a treatment program; absence of any form of recidivism), in which case, the stay could be converted to an exclusion from notification. Alternatively, the event could

be negative (e.g., failed treatment; sex-offense recidivism), in which case the stay, could be converted to inclusion in notification. Like outright exemption, this approach avoids the automatic imposition of costs. Unlike exemption, a stay would create incentives for offenders to behave in socially desirable ways, which the existing scheme fails to do.

3. Unintended consequences of exemptions and stays

For net benefits of reform to be positive, it is not necessary for the riskiest exempted registrants to pose less sex-offense-recidivism risk than the least risky juveniles not exempted. What matters are the relative magnitudes of the risk-weighted sums of the exempt and non-exempt fractions. For these relative magnitudes to be reliably estimated, risk assessment must have a high degree of accuracy. False positives (i.e., juvenile offenders exempted who recidivate) are sources of new social cost that must be taken into account. The higher the false positive rate, the lower will be the social benefits of reform and the greater will be its political controversy.

Table 8 illustrates how unintended social costs would result for any exemption fraction. Inevitably, there will be some exempted offenders who commit new sex offenses. These offenses are unambiguously social costs and should not be dismissed. Whether they are false positives, however, depends on whether the exemption is the proximate cause of their sex-offense recidivism—that is, would registration or notification (as appropriate) have prevented the offense? The best evidence is that registration prevents one incident in eight. Yet it is unlikely that notification would have prevented any subsequent offense. This matters because the exemp-

tion is likely to be blamed whenever an exempted offender recidivates, irrespective of whether the offense would have occurred anyway. This may lead policymakers to desire that any choice of exemption fraction include substantial risk aversion.

Of course, it is also true that any choice of exemption fraction will exclude some offenders who do not commit future offenses. For these offenders, being left out of the exemption means the social benefits that could have been obtained by exempting them remain unrealized. A more liberal exemption rule would enable these benefits to be realized, but only by accepting a higher rate of false positive, higher unintended social costs and greater political risk.

TABLE 8: UNINTENDED CONSEQUENCES OF REGISTRATION AND NOTIFICATION EXEMPTION

Exemption Category	Exempt	Nonexempt
Sex Offense Committed After Reform		
Yes	Potential False Positive Social cost = marginal damage if reasonably attributable to exemption	No Change No social costs
No	No Change No social costs	False Negative No social costs Unrealized social benefits

4. Improved risk assessment

The AWA mandated a three-tiered scheme for determining the length of time sex offenders must register. However, the scheme relied exclusively on attributes of the offense for which an offender was convicted in adult courts or adjudicated delinquent in juvenile courts. That assignment rule was rational if the likelihood and type of future offense is accurately and exclusively predicted by the type of past offense.³³ But Congress had no evidence indicating this assumption was true. Subsequent research (though using admittedly small samples) has not shown that registration status is predictive.

A review of the validity and reliability of juvenile-sex-offender risk assessment is beyond the scope of this analysis. Nonetheless, a rigorous, policy-neutral review should be conducted and validated before proceeding with any of the potential reforms listed here. Each reform alternative assumes that the risk of sex-offense recidivism can be ranked, at least in broad groups commensurate with proposed exemption rules. It

33. The inference is logical, and is recognized by criminologists in the field. See Letourneau, Armstrong, Bandyopadhyay and Sinha (2012), p. 203; and Caldwell, Ziemke and Vitacco (2008), p. 90.

must be true, for example, that the estimated risk of sex-offense recidivism, weighted by its social cost, is less for an exempt than a nonexempt group. All other factors held constant, the greater the difference in cumulative risk between the exempt and nonexempt fractions, the greater will be the net social benefit of the proposed reform.

E. Distributional effects

Benefit-cost analysis treats effects the same, regardless who bears costs or collects benefits. Net benefit is the sum of aggregate benefits less the sum of aggregate costs. For various reasons, however, economically efficient outcomes often are not always preferred by the public. One reason is that benefits and costs may be distributed unequally. The public also may care about the identities of “winners” and “losers,” and it may care a lot when others “win” and they “lose.”

Reforming juvenile-sex-offender laws is an example where “winners” and “losers” appear to be different people. The social costs of the reform alternatives suggested here would be widely dispersed. There is no subset of the population that would be expected to bear a disproportionate share of the increased risk of sex-offense recidivism, whatever it is.

Social benefits, however, would tend to be focused. For registration exemptions, exempt juvenile offenders and their families would capture virtually all of the benefits. Benefit-cost analysis may ignore this fact, but the public might not be indifferent. For notification, the major beneficiaries would not be offenders or their families; it would be their neighbors and landlords, who would avoid the disamenity value that listing on the registry imposes on their real estate. Other third parties, such as schools and employers, would also benefit. They could reduce or eliminate expenditures to manage employee relationships and labor-law liability risks.

Proponents of reform should recognize that the distribution of benefits and costs will matter, possibly more than aggregate benefits and costs. The public is likely to be more interested in reducing costs borne by neighbors, schools and employers than in reducing costs to juvenile offenders, sympathetic anecdotes notwithstanding.³⁴

I. Practical considerations for reform alternatives

The alternatives described here assume that juvenile sex offenders can be ranked in order of the expected social costs of sex-offense recidivism. Expected social costs equal the weighted sum of each potential future sex offense multiplied by the probability of occurrence and the unit social costs each

34. Some members of the public will oppose exemptions from notification even if it conveys no reliable or useful information. For that reason, proponents of reform may have more success focusing public attention on how existing law imposes unintended costs on third parties.

offense entails. A high level of precision in risk assessment is not essential for this analysis, because each exemption alternative is binary. However, a high degree of accuracy in risk assessment is important because inaccuracy leads to misclassification. Misclassification, in turn, leads to false negatives and (more importantly) false positives. The aggregate value of the weighted sum of false negatives and (especially) false positives must be accounted for in the estimation of social benefits and costs of each exemption alternative.

Substantial resources have been devoted to developing and refining risk-assessment tools to predict future sex-offense recidivism risk. The reform alternatives suggested here would leverage these investments into public policy and make additional investments even more valuable. Every improvement in the accuracy of risk assessment has the capacity to reduce the social cost of misclassification, thus making reform by targeted exemption more attractive.

One of the touchstones of juvenile justice policy is the belief that juvenile and adult sex offenders are (mostly) different, thereby establishing a plausible scientific predicate for treating (most) juvenile offenders differently. The development of validated tools for objectively, accurately and reproducibly assessing the risk of juvenile sex offender recidivism is therefore key to transforming this belief into public policy. The reforms listed above—and quite likely, any other reforms—are infeasible unless and until this step is completed satisfactorily. The public is likely to be highly risk averse with respect to policy choices that are framed as potential losses, which any relaxation of registration and/or notification regulations on juvenile offenders would appear to be. Framing reform as offering a large reduction in social costs to third parties (and only incidentally to juvenile offenders) could help overcome psychological barriers to adoption.³⁵

2. Political considerations for reform alternatives

Sex offenses, and especially the subset of offenses that involve child victims, elicit emotive factors observed with few other risks. The legislative history of federal regulation includes many claims that even the most draconian requirements were justified if they could prevent even a single (child) sex crime. This does not mean Congress ignored the social costs of its actions. It could, for example, have made the AWA even stricter, but refrained from doing so. Its decision to stop where it did and not go the next step, or the step after that, proves there is a limit on how much cost can be politically imposed and socioeconomically endured.

Nevertheless, any reform proposal that exempts some juvenile sex offenders from registration and/or notification must contend with the near certainty that relaxation of regulatory

requirements increases the actual and (especially) perceived risk of sex offense recidivism. The change in incidence may be undetectable using even the best available analytic methods, but an inability to detect an increase is not neither statistical nor (especially) popular proof that an increase did not occur. Moreover, when an exempt juvenile offender recidivates, there will be a substantial backlash. The economic explanation that the social costs of this increase in risk is greatly exceeded by the social benefits of exemption is highly unlikely to be persuasive.

Reform also may encounter entrenched groups of rent seekers that populate the cottage industry created by the AWA and its predecessors. These groups include nongovernmental organizations, background-search firms and law-enforcement agencies (or their leaders) that are invested in the notification system as it stands today.

Reform also must contest with the fact that public support can be substantial for legislation that imposes extraordinarily high social costs without any credible evidence of social benefit. Since 2004, Pennsylvania has enacted 23 laws that “significantly impact the reporting, investigation, assessment, prosecution and judicial handling of child abuse and neglect cases.”³⁶ A bill enacted Oct. 22, 2014, requires every person who serves in any paid or volunteer capacity responsible for the welfare of a child or having direct contact with children to obtain advance permission from the state.³⁷ Securing permission requires obtaining a state criminal-history report, a child-abuse history clearance and, in many cases, a fingerprint-based federal criminal history report as well.³⁸ Any person responsible for hiring or obtaining volunteers who violates these requirements commits a third-degree misdemeanor, which is punishable by fine not exceeding \$1,000 or imprisonment not exceeding one year.

Despite these social costs, and the absence of credible evidence that any social benefits will result, there appears to be no public opposition to these laws, even from dedicated opponents of governmental acts that impair privacy and liberty. Their lack of interest may be a pragmatic recognition that opposition to even draconian laws risks being accused of favoring child molesters over children.

35. See Tversky and Kahneman (1986).

36. Pennsylvania Department of Human Services Office of Children Youth and Families (2015a).

37. Pennsylvania Act 153 (P.L. 2529) (2014). The bill passed by a vote of 175-18. See Pennsylvania House of Representatives (2014).

38. Pennsylvania Department of Human Services Office of Children Youth and Families (2015b).

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Richard earned his master's in agricultural economics from the University of California at Davis, his master's in public policy from the Harvard Kennedy School and his doctorate in public policy from Harvard University.

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