
MISSION

The Wagner Review is the student-run academic journal of the Robert F. Wagner Graduate School of Public Service at New York University. *The Wagner Review* promotes dialogue on a wide range of issues related to public service by publishing original research from a diverse group of students and alumni that reflects the academic programs offered and scholarly research conducted at NYU Wagner.

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The Wagner Review

New York University | Robert F. Wagner Graduate School of Public Service

295 Lafayette Street | New York, NY | 10012-9604

www.thewagnerreview.org | wagner.nyu.edu | 212.998.7400

THE WAGNER REVIEW ■ Volume XVIII, 2010–2011

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The Review accepts submissions from current full- and part-time students of the school, as well as from alumni. Articles are vetted through a competitive process by the Review Board and prepared for production by the Editorial Board. Articles should be submitted in English, and should represent current original research. Submissions should represent the broad range of interests relevant to the wider NYU Wagner community. For more information, please visit www.thewagnerreview.org/join/submit-your-work/.

EDITOR'S NOTE

As public servants, it is difficult for us not to reassess the public sector in light of uncertain economic conditions. **David Colby Reed** offers a cautionary note: “By advancing blame-based causal narratives, policymakers risk treating the symptoms of the crisis rather than addressing its root causes.” Recovery has begun by many measures, but followers of the public sector have much to be concerned about. Frustrations about labor, public finance, service delivery, and individual financial wellbeing have opened new arenas for spirited public dialogue. Politically, pervasive dissatisfaction with the status quo accompanied the rise of the Tea Party. Overseas, this discourse has exploded as popular movements challenged regimes in North Africa and the Middle East. The duties of government are less clear, and as public service practitioners, we must make sense of it before we can move forward.

The pieces presented in the 2010-2011 edition of *The Wagner Review* tackle changes in government from ground-level programs to their fundamental structures.

Redistributive programming has reentered national discourse as lawmakers debate the efficacy of these programs and their financial burden. In an exploration of a National School Lunch Program pilot in Philadelphia, **Michelle R. Wong** finds that a simpler method to determining eligibility boosts both participation and efficiency. In the first of two pieces of original empirical research, **Elizabeth Wolff, Kristin Van Busum, Rebecca DiBennardo, Blanca Esquivel, and Alissa Vladimir** draw an instructive connection between income transfers and maternal and infant health. Locally, **Timothy Farrell** delves into the first conditional cash transfer program implemented in the U.S., and argues that its best chance for success is to focus on early childhood.

Three pieces reexamine hidden or inconspicuous infrastructure and provide concrete solutions to meet new demands. In New York, **Alexander J. Wolk** relays best practices in green infrastructure that the city can use to meet its ambitious environmental goals. **Amalea Smirniotopoulos** investigates the New York Police Department's information infrastructure, offering a proposal to measure performance with measures of community perceptions as well as crime. On a national scale, **Douglas Coulter** explores the federal system that allocates space for wireless communications and evaluates a proposal to auction the portion previously used by over-the-air television broadcasts.

Out of periods of crisis often come opportunities for change and systemic improvement. As the democracy-building process begins in Egypt, **Brianne Lute** describes challenges that the nation will face during its transition as well as elements that are critical for the establishment of a successful democracy.

Finally, this volume's second empirical investigation tackles the coordination of longstanding policies within a country. **Zayne Abdessalam, Fernando Henao, and Shana Wright** detangle the intents of agricultural policies and their impacts on the organization of farms.

Our authors demonstrate the relevance of NYU Wagner's integrative, interdisciplinary academic approach, as refining government is a function of resources, planning, implementation, and reflection. In this time of financial restraint and uncertainty, there is increased pressure for governments to do more with less, reevaluate old paradigms, find innovative solutions for new challenges, and for some, decide how to allocate political power and authority.

Sean Capperis
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ACKNOWLEDGEMENTS

The 2010-2011 school year has been a transformative one for *The Review*, and it could not have happened without our board, staff, advisors, and allies in the NYU Wagner community.

Business Manager **Edna Mariñelarena** has found new efficiencies in our production process and Public Relations Manager **Amanda Doreson** has brought new energy to the public face of *The Review*. We thank Online Editor **Diana Huynh** for her simultaneous guidance in the production process and development of our online journal. Copy Editor **Rob Horning** and Designer **Alex Muller** have taken the presentation of our print edition to new levels of quality and clarity. The Editorial and Review Boards are the heart of *The Review*, and they and our authors embody our student-centered approach to producing the journal. As we developed our operating strategy for this year and the future, **Aja Horwitz Carpenter**, **Tracey Gardner**, and Professor **Michael Doran** have provided invaluable advice to keep the journal sustainable.

We are grateful to a new partnership of school and student leadership for making this year's journal possible. We look forward to the continued involvement of the Wagner Student Association and the student body in future editions of *The Review*. Finally, we thank **Rogan Kersh**, **Tyra Liebmann**, **David Schachter**, and Dean **Ellen Schall** for their continued support of student scholarship at NYU Wagner and the unique educational enrichment of a student-produced journal.

Together, our efforts this year will ensure that we will continue to share innovative ideas for public service with the NYU Wagner community and a broader community of practitioners for years to come.

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AN ASSESSMENT OF OPPORTUNITY NYC-FAMILY REWARDS

A CONDITIONAL CASH TRANSFER DEMONSTRATION PROJECT

TIMOTHY FARRELL

ABSTRACT Over the past 15 years, developing countries have experimented with conditional cash transfers (CCTs) as a means of alleviating poverty and spurring poor families to invest in their children's human capital. Recently, New York City piloted the first CCT program in a developed country: Opportunity NYC-Family Rewards, a randomized, controlled demonstration project that enrolled 4,800 families. Similar to programs developed in Mexico and Brazil, Family Rewards offered participants cash rewards, which ranged from \$50 to \$600, conditioned on such behaviors as meeting school-attendance benchmarks, maintaining health insurance, and maintaining full-time employment. The initial evaluation by MDRC, a policy-research firm, found that while the program was successful at reducing current levels of poverty among treatment families, the results were insignificant or mixed for a number of other targets, such as improving academic performance among elementary and high school students. This paper recommends that future CCT demonstration projects in the U.S. focus on conditioning behaviors that lead to investments in early childhood. Research suggests that investments in early childhood reap larger rewards than those made later and may help mitigate the cognitive and noncognitive deficits that are associated with exposure to poverty in early childhood.

OVERVIEW

Since 1997, an increasing number of developing countries have adopted conditional cash transfer (CCT) programs as a means of reducing poverty and inducing poor and near poor families to invest more fully in their children's human capital.¹ In contrast to unconditional cash transfers, which may base eligibility requirements on such factors as income and number of dependents, CCT programs disburse aid only to families who successfully fulfill prespecified human-capital investments, such as immunizing their children and making sure their children meet school-attendance benchmarks.

In 2010, MDRC, a policy-research firm, released findings of the first randomized CCT demonstration project attempted in the United States: Opportunity NYC-Family Rewards, an antipoverty initiative spearheaded by New York City Mayor Michael Bloomberg and designed and administered by MDRC and Seedco, a workforce development organization. Although MDRC found that participation in Family Rewards successfully reduced current levels of poverty among treatment families, the results of other program goals, such as improved academic performance among children and improved workforce participation among adults, were mixed or insignificant.² The Bloomberg administration announced that the program would end in August 2010, after a three-year run; however, MDRC will continue to collect data from families through 2013, during which time additional evaluations and reports will be released.

This paper assesses the effectiveness of Family Rewards within the broader context of CCT programs across the globe and takes a closer look at why the education-focused conditions failed to produce any significant improvements among children from treatment families. Given the evidence that interventions during early childhood tend to produce greater returns than those staged later in adolescence, this paper recommends that future CCT pilot programs in the U.S. experiment with conditioning parent behaviors that influence early childhood development. Such investments may improve the cognitive and noncognitive abilities of children prior to their entrance into formal education, thereby strengthening their human-capital development.

OPPORTUNITY NYC-FAMILY REWARDS

Funded with private money from the Rockefeller Foundation, Opportunity NYC-Family Rewards represents the first time a CCT program has been tested in a developed country.³ Unlike CCT programs in the developing world, Family Rewards did not function as the sole safety net for the poor. Rather, this experimental program was designed to supplement existing antipoverty policies in the U.S., including income supports like Temporary Assistance for Needy Families (TANF) and the Earned Income Tax Credit (EITC). As a privately funded initiative of Mayor Bloomberg's NYC Center for Economic Opportunity, Family Rewards moved forward without incurring the political debates that often surround the proposition of publicly funded CCT programs. Commentators on the political right have argued that CCTs erode the "moral obligations" that come with good parenting.⁴ Meanwhile, critics on the left argue that CCTs miss the mark since the causes of poverty, including a lack of high-paying jobs and weak educational systems, are more structural than behavioral in nature. The left also tends to see an overbearing paternalism inherent in CCTs.

Beginning in the summer of 2007, Seedco and its partners selected six community districts with high and persistent concentrations of poverty in the boroughs of Manhattan, Brooklyn, and the Bronx as pilot locations for Family Rewards. Seedco and various existing community-based organizations with which it partnered consulted administrative lists of public-school children who participate in the federal free and reduced-price school-lunch program to recruit families with incomes of no more than 130 percent of the federal poverty level. They also performed outreach in the community districts in order to reach as many eligible families as possible.

Despite some initial challenges in recruiting families (some of whom suspected the program was a scam), Seedco and its partners enrolled approximately 4,800 families and 11,000 children into the experiment. Roughly half would earn rewards conditioned on their behavior (treatment group) and the other half would receive no rewards (control group).⁵ A randomized, controlled design was necessary to more accurately estimate the effects of the intervention and to reduce the potential for bias.

CCT programs are predicated on the theory that poor parents are likely to underinvest in their own and their

children's human capital. Economists theorize that poor parents, especially those with limited educational attainment, may not calculate the returns to education as fully as a middle-class parent would. Furthermore, the state may have an interest in stimulating parental investment in a child's human capital if the family's private level of investment is below the socially optimal level.⁶ This is particularly true if there are positive externalities (for instance, a reduction in the crime rate and improved worker productivity) that result from a more educated populace. Additionally, poor families may face credit constraints that prevent them from investing in their children's human capital. CCT programs function to remedy these and other market failures.

The rewards schedule created by Seedco and its partners consisted of three broad categories: education, health, and workforce. Treatment families were eligible to receive rewards as low as \$50 (for obtaining a library card for their children) and as high as \$600 (for each child who passed a high school Regents exam).⁷ In general, rewards were paid directly to parents upon demonstrating that a task had been completed successfully. The program designers worked with local financial institutions, such as credit unions, to offer participants free checking accounts into which cash rewards were automatically deposited. This allowed treatment families to avoid relying on expensive check-cashing businesses and increased the proportion of families who became "banked" by 20 percent, a statistically significant amount.⁸ Finally, Family Rewards offered no other social services for families, since the designers wanted to test the efficacy of the cash incentives alone. Non-profit organizations that helped administer the program referred families to other social-service agencies and answered technical questions about the program but did not provide substantive resources to treatment families.

FAMILY REWARDS: EARLY RESULTS

As an antipoverty program designed to mitigate the intergenerational transmission of poverty by focusing on human-capital investments, Family Rewards may have effects that reach beyond the current period. The initial results, however, released by MDRC in March 2010, present a window into the program's effectiveness after 18 months and cover the 2007-08 and 2008-09 school years. The early results suggest that Family Rewards had a significant impact on reducing current levels of poverty and material hardship among treatment families, had

small but significant effects on participants' use of health services, and had small but significant effects on the academic outcomes of "better prepared" ninth graders.⁹

The most statistically robust set of short-term outcomes that resulted from Family Rewards pertained to reductions in poverty and material hardship in the current period. The findings suggest that, among the treatment group, the percentage of families below the federal poverty level declined by approximately 11 percent. Likewise, the percentage of families in "severe" poverty (defined by MDRC as those below 50 percent of the federal level) declined by 13 percent.¹⁰ Across various measures of material hardship, such as measures of food and housing insecurity, the percentage of treatment families experiencing hardship declined by approximately 7 to 8 percent.¹¹ While these results are encouraging, they are not surprising, since MDRC reports that 98 percent of families who enrolled in the treatment group earned some rewards in the first two program years and that 65 percent earned some cash rewards in every period. The average family received a total of \$6,000 over the first two years of the program.¹² At the very least, these findings demonstrate the viability of implementing a CCT program within the context of a low-income urban neighborhood in the U.S. in order to provide families with short-term income support. The results of Family Rewards' effectiveness on improving human-capital accumulation, however, were not as robust.

The effect of Family Rewards on participants' access to health care was relatively small. For instance, the impact of the CCT on health insurance coverage reduced the proportion of treatment families who lacked health insurance by three percent. The investigators attributed this marginal impact to the fact that New York City and State offer relatively strong programs for low-income families with children to access health care. Ninety-four percent of families indicated that they had some form of health coverage prior to randomization.¹³ The effects of the CCT on education outcomes were likewise marginal, with few measures reaching statistical significance. Among the fourth-, seventh-, and ninth-grade cohorts, no difference was detected in students' proficiency on English language arts and math standardized tests in the program's second year. The program had no effect on elementary- and middle-school attendance, although it did appear to slightly improve attendance among ninth-graders (the researchers point out that attendance in elementary and middle school is generally quite high, averaging 90 per-

cent, suggesting that there was little room for even marginal improvements).¹⁴ Policymakers should bear in mind that these results, while not especially encouraging, do not tell the full story of Family Rewards. It may simply be too soon to accurately estimate the cumulative effects of the program. To what extent, then, do the preliminary findings of Family Rewards match findings from evaluations of CCT programs in other countries? What lessons might U.S. policymakers who are interested in piloting additional CCT trials learn from their international peers?

RESULTS OF CCT PROGRAMS ACROSS THE GLOBE

Much of the growth in the number of CCT programs worldwide has occurred since 1997, when only two countries, Mexico and Brazil, were experimenting with the policy. Since then, many Latin American and Caribbean countries have launched CCT programs of varying scope. CCTs have also appeared in Africa and South Asia, where Bangladesh has instituted a CCT program as a means of conditioning poor parents to send their girls to school to reduce the extreme gender gap in education.¹⁵

Although a recent innovation, CCT programs have produced a wide literature on their effectiveness. World Bank economists Ariel Fiszbein and Norbert Schady attribute the strong “evaluation culture” surrounding CCTs, in part, to the fact that CCT systems require an inordinate amount of data in order to function effectively.¹⁶ For instance, CCTs must develop sophisticated systems for verifying client compliance with program rules and for disbursing payments. Such data-collection systems facilitate the evaluation process. Furthermore, practitioners and researchers in developing countries that have instituted CCTs have a common interest in collaborating and sharing news of what works. Although the economic and political contexts of each country that implements a CCT program are unique, the findings from various studies suggest that CCTs are effective at reducing current poverty but vary in their effectiveness at building human capital. Given these similarities to Family Rewards, some of the findings from particular CCT projects may be of particular interest to U.S. policymakers.

Aggregating results from a number of studies, Fiszbein and Schady demonstrate the effectiveness of CCT programs at improving consumption among the poorest households while minimizing any perverse incentives such as

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CCT programs are predicated on the theory that poor parents are likely to under-invest in their own and their children's human capital.

reducing adult labor.¹⁷ For instance, Mexico's CCT program, Oportunidades, had an 8.3 percent increase in per capita consumption for the median household in the study.¹⁸ The authors note that CCT programs demonstrate positive impacts along other measures, such as the “headcount” index, which measures the number of poor individuals, and the poverty gap, which measures how far poor families fall below the official poverty line. In addition, the literature indicates that CCTs have positive behavioral effects on families, such as reducing the amount of child labor (since families are given incentive to send children to school rather than to work). Also, CCTs do not appear to function as disincentives for adults to enter the labor market, a behavioral response that critics of CCTs often fear. The evidence does not seem to support this idea, perhaps because among the very poor marginal increases in income do not offset an adult's need to enter the labor market.¹⁹

Increasing a poor family's ability to consume is only one of the goals of the CCT; equally important is conditioning the family to invest in the human capital of its children as a means of improving the odds that poor children will not grow up to be poor adults. To improve human-capital accumulation, most CCT programs address the disparity that exists between poor and nonpoor families' access to critical services such as schools and health clinics. CCT programs condition parents to send their children to school in order to meet attendance requirements as well as to make use of preventive health services (such as doctor's checkups and immunizations). The evidence suggests that the effects of CCTs on school attendance are most profound among the most marginalized families, those who would not send their children to school otherwise.²⁰ The evidence on whether CCTs actually improve final educational outcomes, however, is more mixed.

Fiszbein and Schady cite studies that suggest that even though CCTs are successful at improving attendance, there is little empirical evidence to suggest that learning outcomes improve for children in CCT treatment families. According to the authors, among the possible reasons for the lack of positive educational outcomes are constraints at the household level, such as poor parenting, which negatively influence a child's development, and a poor level of educational instruction in school.²¹ The ability of the CCT to affect human-capital development, then, is hampered by such constraints. There is, however, a wide and growing body of literature that suggests that investments made in early childhood may have a bigger payoff than those made later in the life cycle.

EARLY CHILDHOOD INVESTMENTS

Economists who examine human-capital development understand it as a dynamic process that occurs throughout the lifetime. Economists James Heckman and Pedro Carneiro propose a model of human capital that builds from the pioneering work of economist Gary Becker, whose early work on the subject was influential in the 1960s.²² In Heckman and Carneiro's model, early investments in cognitive and noncognitive development facilitate later investments. These investments, they argue, are "synergistic" and "complementary" in nature. In their view, deficits in cognitive ability begin early and have profound consequences; instead of equalizing the abilities of individuals, schools function to exacerbate skill gaps that are present in children from impoverished backgrounds from an early age.²³ In other words, very young children who start off cognitively behind their peers find it increasingly difficult to catch up as their skills gap widens once they begin schooling.

According to this model, investments made in early childhood reap large returns later, since the skills young children develop in early childhood form the building blocks on which later investments are made. Without those initial investments, the child risks growing up with an ever widening deficit that is resistant to interventions staged later in the life cycle. School interventions in middle or high school, or job-training interventions staged in adulthood, may not be enough to offset the early deficits that result from growing up in a poor household.

Early childhood interventions may take a variety of forms, from enriched day care and preschool programs

to more targeted interventions that also include parents in activities such as parenting classes. Heckman and Carneiro note that early interventions are effective at improving non-cognitive development such as social and emotional skills.²⁴ The authors argue that it does not make sense to evaluate such interventions along cognitive-skill-based lines, such as measured test scores. This may explain why studies of Head Start, the federally funded school-readiness program, find a significant "fade out" of the cognitive effects of the program once children hit school age.²⁵ Research has

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What lessons might U.S. policymakers who are interested in piloting additional CCT trials learn from their international peers?

found, however, that African-American children who participated in Head Start were less likely to interact with the criminal justice system than their non-Head Start siblings.²⁶ The evidence suggests that a specific payoff of an early childhood investment such as Head Start is reduced incarceration rates. Such a beneficial outcome, which avoids the economic and social costs of imprisonment, may very well outweigh the costs of the intervention.

EARLY CHILDHOOD INVESTMENTS AND CCTS

Heckman and Carneiro argue that while schools matter, families may matter more in influencing human-capital accumulation.²⁷ If such an argument is true, might a CCT that conditions parents to stimulate children's cognitive and noncognitive development be more effective than one that merely conditions parents to send their children to school? Is there evidence to suggest that such a strategy might work?

A promising study by Macours, Schady, and Vakis offers insight into the extent to which CCT programs affect the cognitive skills of children in treatment families.²⁸ The authors studied a randomized

trial CCT program in Nicaragua, Atención a Crisis, and evaluated a control group against three distinct treatment groups. The authors collected data on the cognitive abilities of children as young as one month old using a number of well-validated cognitive measures. Finally, they drew detailed data on how treatment families spent their cash transfers (for example, whether treatment families purchased more nutrient-rich foods and stimulating toys and books for their children). The results demonstrate that, at baseline, the low-income children in the study displayed cognitive delays that would likely impair their development. Following only nine months of treatment, children in program families demonstrated improvements in social and language development and were more likely to have a cognitively rich home environment. Treatment children were more likely to have books at home, to have been read to by a family member, and to have been enrolled in preschool. Researchers found statistically significant results within a year of the program's start, suggesting that early intervention may yield significant results in a short period of time.

Such findings offer promise to policymakers who are considering future CCT trials in the U.S. Despite the differences in social and economic contexts between the U.S. and the developing world, the early findings from Family Rewards tend to match those from other countries, suggesting that, at the very least, CCTs are effective at reducing current poverty. The question, then, is whether a CCT program can provide additional value in terms of human-capital accumulation, since the U.S. already has a firmly established social safety net. A CCT program in the U.S. is valuable only to the extent that it can help break the intergenerational transmission of poverty, a prospect that relies on human-capital investments.

Although the effect of Family Rewards on children's educational outcomes such as test scores was insignificant, it is worth considering whether a CCT that bases its conditions on early childhood development might demonstrate stronger results. Some of the findings from Family Rewards reinforce Heckman and Carneiro's position that skill gaps develop early and are not easily overcome. For instance, the only group of students for whom Family Rewards had a significant impact were those ninth-grade students who were already "more proficient" in math prior to randomization. The rate of progression from ninth to tenth grade for this subgroup was five percent-

age points higher than for the control group.²⁹ The results suggest that an educational intervention staged in adolescence will have only marginal impact and will most likely have the most profound effect on those students near the top of the ability distribution. Additional CCT demonstrations that offer behavioral rewards for investments made to adolescent development are likely to result only in similarly limited progress, since the conditions do not attack the problem of cognitive and noncognitive deficits that form earlier in childhood.

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As the first CCT program ever designed and piloted in the developed world, Family Rewards demonstrated that a CCT can be implemented successfully in the U.S. and can complement existing policies to reduce current poverty.

What might a CCT demonstration look like that conditions parents to make investments in early childhood? Conditioned participation in early childhood programs such as Head Start and Early Head Start would offer the opportunity to work with existing programs. Designers of CCT pilots might also explore conditions that require participation in developmentally appropriate activities such as group music classes and story hours at local libraries. More intense interventions that involve teaching parents to engage in stimulating play with their children will increase the cost of the intervention and will depend on the ability of the CCT program to collaborate with social-service agencies. Such interventions may also prove to be more controversial than Family Rewards, which respected each family's parenting practices. A CCT demonstration that requires home visits from social-service workers or counselors, for instance, may be seen as encroaching on parents' rights to decide what is best for their child.

CONCLUSION

Although Family Rewards did not yield significant improvements in human capital accumulation among participants and their children, policymakers should heed the promise of CCT programs reflected in the successes of this trial demonstration. As the first CCT program ever designed and piloted in the developed world, Family Rewards demonstrated that a CCT can be implemented successfully in the U.S. and can complement existing policies to reduce current poverty. As policymakers

and researchers further refine their ideas regarding CCTs in the U.S., they should consider experimenting with a range of CCT targets, such as early childhood, as this paper has suggested. Given the empirical evidence that investments in early childhood offer bigger returns than interventions staged later, policymakers should incentivize poor parents to make human-capital investments in their young children's development. Such investments are likely to be cost-effective in the long term and offer persistent returns as the child develops into adulthood.

NOTES

- 1 Ariel Fiszbein and Norbert Schady, *Conditional Cash Transfers: Reducing Present and Future Poverty*. (Washington, DC: World Bank, 2009), 1-3.
- 2 James Riccio et al., *Toward Reduced Poverty Across Generations: Early Findings from New York City's Conditional Cash Transfer Program*, (New York, NY: MDRC, 2010), ES 9-17.
- 3 Riccio et al., ES-1
- 4 The authors of the MDRC report quote Heather MacDonald of the Manhattan Institute, who told Tina Rosenberg of the *New York Times Magazine*: "If Opportunity NYC goes large scale, it will further break down the moral obligation to care for one's child and adopt the repertoire of parenting behaviors the middle class takes for granted. It will replace that with the expectation that I'm only going to do it if you pay me." See Tina Rosenberg, "A Payoff Out of Poverty?" *New York Times Magazine*, 21 December 2008, <http://www.nytimes.com/2008/12/21/magazine/21cash-t.html?scp=2&csq=rosenberg%20poverty&st=cse> (15 February 2011).
- 5 Riccio et al., ES-6
- 6 Fiszbein and Schady, 8-9.
- 7 For a full schedule of awards, see Riccio et al., ES-4.
- 8 Riccio et al., ES-13.
- 9 Riccio et al., ES 9-17.
- 10 Riccio et al., 126
- 11 Table ES.2, "Impacts on Selected Outcomes Measuring Poverty, Hardship, Health, and Work" summarizes these findings, in Riccio et al., 137.
- 12 Riccio et al., 8.
- 13 See table 2.3 in Riccio et al., 53.
- 14 Riccio et al., 166-67.
- 15 Fiszbein and Schady, 7.
- 16 Ibid.
- 17 See table 4.1, "Impact of CCTs on Per Capita Consumption, Various Years" in Fiszbein and Schady, 105.
- 18 In this study, from October 1999, the median daily per capita consumption of the control household was only \$0.58 (in 2009 U.S. dollars). In Fiszbein and Schady, 105.
- 19 In addition to theorizing that, among the very poor, the "income elasticity of leisure may be quite low," Fiszbein and Schady offer several other reasons studies fail to show that CCTs cause poor adults to work less. The possible reasons include a need for adults to work more to offset any losses from reductions in child labor that the CCTs cause and a perception that the CCTs may only be a temporary windfall rather than a permanent entitlement. In Fiszbein and Schady, 117-119.
- 20 Fiszbein and Schady, 164.
- 21 Fiszbein and Schady, 163-164.
- 22 Gary Becker, "Investment in Human Capital: A Theoretical Analysis," *Journal of Political Economy* 70 (1962): 9-49.
- 23 James Heckman and Pedro Carneiro, "Human Capital Policy," NBER Working Paper 9495, (Cambridge, MA: National Bureau of Economic Research, 2003), 2-10.
- 24 Heckman and Carneiro, 8.
- 25 Eliana Garces, Duncan Thomas, and Janet Currie. "Longer Term Effects of Head Start." NBER Working Paper 8054. (Cambridge, MA: National Bureau of Economic Research, 2000).
- 26 Garces et al., 17.
- 27 Heckman and Carneiro, 5-6.
- 28 Karen Macours, Norbert Schady, and Renos Vakis, "Cash Transfers, Behavioral Changes, and the Cognitive Development of Young Children: Evidence From a Randomized Experiment," Policy Research Working Paper 4759. (Washington, DC: World Bank, 2008).
- 29 See table 6.17 in Riccio et al., 186.

INCREASING IMMIGRANT STUDENT ACCESS TO NATIONAL SCHOOL LUNCH BENEFITS: IMPLICATIONS OF FEDERAL CERTIFICATION METHODS

MICHELLE R. WONG

ABSTRACT A core aim of the recent Healthy, Hunger-Free Kids Act of 2010 was to increase access to the National School Lunch Program (NSLP) by using direct certification with a multiplier to identify and enroll eligible students. However, an alternate strategy—the survey method employed by Philadelphia’s Universal Feeding Program (UFP)—has proven more effective at expanding access to the NSLP, particularly among immigrants. This paper demonstrates the superior effectiveness of the survey method compared with direct certification and offers a detailed recommendation for why other communities, particularly those with large immigrant populations like Philadelphia, should adopt the survey method.

INTRODUCTION

In December, Congress passed the Healthy, Hunger-Free Kids Act of 2010, a landmark piece of legislation with two core aims: (1) to increase students' access to in-kind meal benefits provided by the National School Lunch Program (NSLP) and (2) to improve the nutritional quality of food served in public schools. Many antihunger advocates applauded the legislation, noting that free and reduced-price lunches can improve health and academic outcomes for students in need by helping ensure they receive adequate nutrition and mitigating other short- and long-term effects of poverty. But for other antihunger advocates, particularly in Philadelphia, the bill raised serious concerns.

Philadelphia's Universal Feeding Program (UFP) pilot, initiated by the U.S. Department of Agriculture's Food and Nutrition Service in 1991, uses a strategy called the survey method to identify and certify students eligible for free or reduced-price lunch.¹ To date, Philadelphia is the only city in the country to adopt this method. Since its implementation, the program has had marked success in increasing participation among eligible students, particularly among students from immigrant families who often do not access all social benefit programs for which they are eligible. Philadelphia's adoption of the survey method was not specifically intended to improve immigrants' participation, but this unexpected outcome was welcome in a city that, compared with peer metropolitan regions, has the largest and fastest growing immigrant population—about nine percent of the total population.² Though early drafts of the Healthy, Hunger-Free Kids Act, which adopts the more common direct certification method, did not include funding to continue the pilot, Philadelphia antihunger advocates fought hard to protect the UFP in its current form. Not only did they succeed but the final version of the legislation also leaves the door open for other cities to adopt the survey method.³

With this opportunity to expand the survey method as a backdrop, this paper demonstrates that the survey method is more effective than direct certification at increasing access to NSLP benefits, particularly for immigrant students. First, this paper outlines some of the particular barriers immigrants face in accessing social benefit programs generally. Next, this paper examines the NSLP, exploring its

diverse benefits and discussing specific advantages and challenges immigrant communities face in trying to access it. Then, this paper provides a comparison of the ways in which the Healthy, Hunger-Free Kids Act and Philadelphia's UFP seek to overcome key barriers to NSLP benefits. Finally, a theoretical assessment offers a detailed recommendation for why other communities, particularly those like Philadelphia with large immigrant populations, should adopt the survey method.

NONPARTICIPATION OF IMMIGRANTS IN SOCIAL BENEFIT PROGRAMS

Numerous studies highlight eligible immigrants' low take-up rates for social benefit programs, including the Supplemental Nutrition Assistance Program (SNAP, formerly food stamps), Temporary Assistance for Needy Families (TANF), and the NSLP.⁴ In fiscal year 2005, the participation rate of eligible noncitizens in SNAP was 50.9 percent, compared with the 65.1 percent participation rate for the overall eligible population.⁵ Mazzolari and Gordon found that from 1993 to 2000, participation in TANF, food stamps, and Medicaid among eligible noncitizens dropped at a rate disproportionate to the federal changes in eligibility for this population.⁶ These findings indicate that factors other than eligibility restrictions likely contribute to nonparticipation among noncitizens and immigrants.

Various studies point to misinformation as a common reason for nonparticipation. The U.S. Department of Agriculture (USDA) and the Urban Institute found that social benefit offices did not always meet the language needs of immigrant clients, and antihunger outreach is often hindered by cultural and language barriers in neighborhoods with high concentrations of immigrants.⁷ Some immigrants believe participation in SNAP or TANF could affect another family member's naturalization efforts.⁸ Additionally, distrust in the application process contributes to nonparticipation of immigrant families in SNAP benefits.⁹ For example, although an immigrant may be eligible for a program, the idea of listing bank account information and the members of a household may intimidate applicants, whether they are undocumented or not.¹⁰ Participation in social benefit programs can be even more limited among immigrant households com-

posed of both citizens and noncitizens. Noncitizens are not always eligible for programs like SNAP and TANF, whereas citizens are. Many changes were made to immigrant and noncitizen SNAP eligibility during the welfare reform years from 1994 to 2000, and participation rates among eligible citizen children in mixed immigrant households dropped from 80.5 percent to 38.1 percent.¹¹ Research illus-

trates the benefits these families could gain by participating: eligible citizen children of noncitizen immigrant parents receiving SNAP benefits are “32 percent less likely to suffer from poor health than if their families did not receive benefits.”¹² Yet, while participation among eligible citizen children has increased in recent years, a wide participation gap remains.¹³

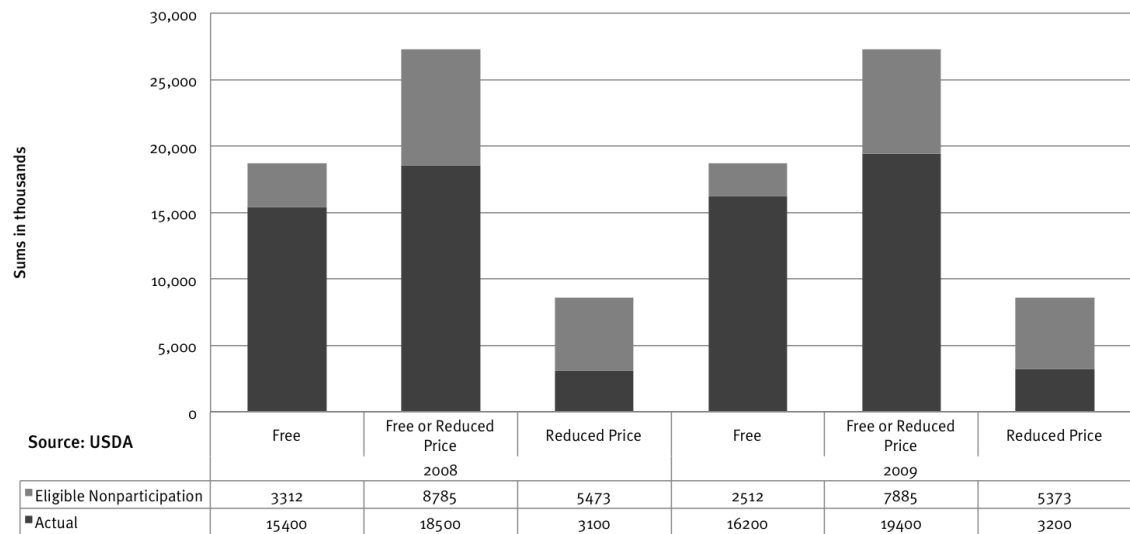


Figure 1. Average Number of Participants and Eligible Nonparticipants in the NSLP, 2008 and 2009

BARRIERS TO NSLP PARTICIPATION

The NSLP is a critical social benefit program, particularly for immigrant students. Unlike SNAP or TANF, eligibility is based solely on need, without regard for citizenship.¹⁴ To qualify for in-kind meal benefits through the NSLP, a student’s family must fall at or below 130 percent of the federal poverty line; to qualify for reduced-price meals, the student’s family must fall between 130 percent and at or below 185 percent of the federal poverty line.¹⁵ The USDA subsidizes school meals based on the estimated percentage of eligible students, and the school is responsible for any difference in actual costs.¹⁶ Yet like other social benefit programs, certain barriers negatively impact take-up rates and increase eligible nonparticipation, especially among immigrants.

If students are not certified directly for the NSLP through their participation in other social benefit programs, they are required to submit a paper appli-

cation to access in-kind meal benefits.¹⁷ According to Wayne Grasela, director of the School District of Philadelphia’s food service division, the return rate of paper applications among eligible families remains low, particularly among elementary school students.¹⁸ Common reasons for this low rate of return are students forgetting to give their parents the forms, the school district having inaccurate mailing addresses, and language barriers.¹⁹ In some cases, eligible families may underestimate their benefit level or not apply for benefits because they are simply not familiar with NSLP income requirements.²⁰ Of students originally approved for reduced-price meals in 2002, 23 percent were still eligible for reduced-price meals, while 31 percent were actually eligible for free meals.²¹ In certain cases, a family may not be eligible at the beginning of a school year but may become eligible because of changes in income or household composition. In such a scenario, the family needs to con-

tact the school to request an application but may not be aware that it can do so.²² Some families may also choose not to apply for NSLP benefits because of the stigma associated with receiving free or reduced-price meals.²³

Perhaps ironically, two of the most significant barriers to participation are processes intended to get eligible students into the program: application and verification. The amount of information and time required by the NSLP application process may intimidate and overwhelm families to the point where they do not apply for the program despite being eligible.²⁴ The current NSLP information letter comprises 14 sections, and the detailed USDA Food and Nutrition Services *School Meals Eligibility Manual* is 114 pages long.²⁵ The NSLP application process involves written statements and may require listing the income of every household member.²⁶ Disclosing this level of information may cause families to distrust the application or to delay applying.²⁷

“ Perhaps ironically, two of the most significant barriers to participation [in the NSLP] are processes intended to get eligible students into the program: application and verification.

The verification process aims to prevent ineligible students from receiving NSLP benefits, but significant evidence shows that it actually blocks eligible students from participating. For example, families that fall close to the NSLP eligibility income threshold may be randomly selected for verification after applying for benefits, a process that involves submitting additional documentation to confirm income and household size and may require an in-school meeting.²⁸ If pay stubs cannot be produced (misplaced, not enough time to gather them, paid in cash, fear) or if a parent cannot meet at the school (work schedule, child care costs, fear), the student may be deemed ineligible for NSLP benefits: “50 percent of parents for whom documentation letters were sent in a 2002

study failed to respond, and their children’s benefits were terminated.”²⁹ A 2003 Mathematica study found that, of those who failed to respond to a verification request and were originally approved for free meals, 51 percent were actually eligible for free meals; another 26 percent were eligible for reduced-price meals.³⁰

Verification places additional administrative burden on the families and school districts but does not appear to minimize moral hazard and can instead confuse NSLP applicants.³¹ An USDA analysis showed that of the 68.1 percent who responded to verification requests during the 2007-2008 school year, 47.8 percent had their initial certification status confirmed (a drop from 65 percent in the 2004-2005 school year), 1.9 percent had their status changed from reduced-price to free, 9.4 percent had their status changed from free to reduced-price, and 9 percent had their status changed from free or reduced to paid.³² While the verification response rate increased from previous years, the data highlight applicant confusion around verification and NSLP eligibility. Assuming that families did not apply simply to be denied benefits, the drop in verified certifications from 65 percent to 47.8 percent may reflect a lack of understanding regarding eligibility parameters. If families are no longer eligible for benefits but attempted to access them, this may indicate a mismatch between income requirements and the needs of families near the eligibility threshold.

Even if families applied and were verified as eligible for the NSLP, students themselves must complete the process to receive benefits. In most NSLP schools, this means submitting a lunch ticket or standing in a school food line, both of which may carry a stigma and cost the student time to eat.³³ The School Nutrition Association reports that the average time designated for lunch decreased from an average of 30 minutes in 2003 to an average of 24 minutes in 2005 across education levels, which includes travel time to and from the cafeteria.³⁴ A more efficient process that does not place the burden of completion on students would increase the number of students who would actually be able to benefit from the meals.

Immigrants are at a particular disadvantage in overcoming these barriers to participation in the NSLP, primarily because of language barriers and inaccurate school or government records. By law, NSLP application materials and other eligibility-related communications must be “to the maximum extent practicable, in a language that parents

and guardians understand,” but the onus of translation is placed largely on school districts.³⁵ Translated templates exist on the NSLP website, but these templates must be updated and edited by individual schools and school districts to fit their specific needs. Language needs and “reasonable efforts” to translate vary by school, making such a mandate difficult to enforce. Consequently, families with limited English proficiency may simply not know about social benefits like the NSLP. Even if documents are translated, families may not feel comfortable submitting written statements, in either English or their native language. While they may be fluent verbally in their native language, they may not be literate in their native language, which may dissuade them from completing the application or verification process in any language.³⁶

Inaccurate school or government databases can also limit immigrant access to NSLP benefits, especially if various entities record names differently, leading to false non-matches in a NSLP certification or verification process.³⁷ On a student level, families may not be aware of available follow-up procedures once they have been denied benefits, and students may therefore not receive meal benefits. On a school level, if enough immigrant students are not certified as eligible due to administrative error, a school may not qualify as a universally free lunch site.

OVERCOMING BARRIERS: THE DIRECT CERTIFICATION AND SURVEY METHODS

Both the Healthy, Hunger-Free Kids Act and Philadelphia’s UFP program aim to increase students’ access to the NSLP by reforming the application and verification processes. This paper now examines their distinct approaches in detail.

Direct certification with multiplier. In the past, states and school districts established different NSLP certification processes that involved varying amounts of paperwork and data comparisons. The Healthy, Hunger-Free Kids Act provides national standards for a streamlined direct certification process to qualify students for the NSLP.³⁸ In an effort to increase the participation of eligible students in the NSLP, the Healthy, Hunger-Free Kids Act provides incentives for states and school districts to compare school enrollment data with SNAP or TANF databases to certify students directly for NSLP benefits.³⁹ The new legislation eliminates the old requirement that SNAP and TANF

recipients must submit a verification letter after direct certification and establishes pilot programs that allow direct certification through Medicaid records.⁴⁰ A federally determined multiplier is then applied to the number of direct certification matches to estimate the total number and percent of NSLP eligible students.⁴¹ School districts then receive federal meal reimbursements based on this estimate.⁴² The Healthy, Hunger-Free Kids Act goes even further to establish the community-eligibility option, which allows schools to offer free meals for all their students without a paper application if at least 40 percent of students are directly certified for free meals (at or below 130 percent of the federal poverty line).⁴³

Survey method. Instead of a federal multiplier, the survey method used in Philadelphia’s UFP supplements direct certification matches with a statistically driven validation phone survey to correct for initial direct certification errors. Philadelphia’s survey is conducted in English or Spanish and consists of no more than four questions to verify a student’s school and household income.⁴⁴ School-level data are then used to estimate the percentage of students eligible for free or reduced-price lunches.⁴⁵ Philadelphia’s UFP provides free meals to all students who attend schools in which at least 75 percent of students are eligible for either free or reduced-price meals (at or below 185 percent of the federal poverty line).⁴⁶

While the direct certification and the survey methods both aim to increase access to NSLP benefits, communities with high concentrations of immigrant students would benefit more from the survey method. This assessment consists of two main considerations: ability to meet social-welfare needs and cost-savings potential.

Direct certification reduces the administrative burden for school districts and the federal government, but its effectiveness hinges on the accuracy of SNAP, TANF, and school district databases. As discussed previously, immigrants underuse social benefit programs like SNAP and TANF;⁴⁷ in 2000, 33.4 percent of SNAP-eligible non-participant households contained children and 3.1 percent were households headed by noncitizen immigrants with eligible citizen children.⁴⁸ Direct certification also assumes that participation in SNAP or TANF serves as a valid and reliable proxy for NSLP eligibility.⁴⁹ Even the USDA has confirmed variation across states in its ability to certify students who are categorically eligible for the NSLP through SNAP.⁵⁰ In addition to bypassing students whose families cannot access TANF or SNAP because of

citizenship restrictions, direct certification could exclude students whose families no longer qualify for TANF or SNAP because of sanctions, time limits, or income fluctuation.⁵¹ Moreover, a federally determined multiplier is a “politically negotiated value rooted in statistical evaluation” and may not be the most appropriate multiplier for every local school district or school. If direct certification captures a nonrepresentative sample, a multiplier could magnify errors if not calculated appropriately, most likely undercounting eligible students.⁵² These same eligible nonparticipants would not receive NSLP benefits through direct certification.

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The survey method more accurately identifies students to meet social demand, and therefore more efficiently meets the needs of both immigrants and nonimmigrants.⁵³ The School District of Philadelphia has claimed that more than 85 percent of students in most Philadelphia public schools fall at or below 185 percent of the poverty line and therefore qualify for NSLP benefits.⁵⁴ According to Community Legal Services, less than a third of the School District of Philadelphia’s 200,000 students received free or low-cost meals in 1991, despite 80 percent of them being eligible.⁵⁵ The initial intent of the survey method pilot was to decrease costs associated with administering the NSLP, but the pilot also increased NSLP participation rates for eligible students. The UFP now includes approximately 200 of the school district’s 280 schools and provides about 121,000 of the School District of Philadelphia’s 167,000 students with free breakfast, lunch, or both every day.⁵⁶ According to the district’s chief business officer, Michael Masch, the cost of providing free meals to so many students “evens out because of the money saved on administrative costs.”⁵⁷

Critics may consider serving ineligible students inefficient or wasteful. However, economies of scale and the marginal costs associated with charging ineligible students for lunch may actually outweigh the costs involved with providing free meals to the whole school.⁵⁸ The ineligible students who receive NSLP benefits through Philadelphia’s UFP attend schools in which 75 percent or more of their classmates are eligible for the NSLP. According to the Reinvestment Fund’s 2007 UFP survey results, in strata comprising schools that would have been 80 to 100 percent eligible through direct certification, 9.1 percent of students across the School District of Philadelphia were ineligible to receive benefits.⁵⁹ Even if all 9.1 percent of ineligible students paid for their meals (as opposed to bringing their own lunch), it would not offset the costs to hire additional staff and security trucks to transport money paid for meals.⁶⁰ In addition, antihunger advocates, food-service managers, and food-service directors report that too many students assigned to the paid or reduced-price lunch categories still do not have the money to receive lunch.⁶¹ Bartfeld and Dunifon suggest that “there may be a particularly vulnerable segment of the population, those who are in precarious financial circumstances who have not yet fallen into poverty, whose ability to meet food-related needs is most affected by the economic and policy context.”⁶² The survey method allows the UFP not only to serve students in poverty but also to help meet the social needs of students near poverty, whose families may be economically vulnerable but not eligible for other means-tested benefits.

In schools with significant immigrant populations, a more accurate accounting of eligibility among immigrant students could lead to higher reported levels of need, and could effectively increase access to in-kind meal benefits for the general school population. For example, South Philadelphia High School’s student body includes a high concentration of immigrant students, and only 44.1 percent of the students would have been deemed eligible for NSLP benefits through direct certification.⁶³ The survey method’s statistical correction for error increased the number of eligible students by 28.1 percentage points, deeming the entire school eligible for free meals.⁶⁴ Figure 2 shows that a higher percentage of immigrant students meets NSLP income-eligibility requirements than U.S.-born students.⁶⁵ Without the survey, the burden of proof to receive NSLP benefits would have fallen to students not identified through direct certification, regardless of nativity. Numerous empirical studies confirm that paper applications “do not fully compensate for a weak [direct

certification] system,” and very poor children who qualify for the NSLP are more likely to receive meals if certified automatically.⁶⁶

Even the survey method is not fail-proof in accurately assessing need for NSLP benefits. In Philadelphia, identifying eligible immigrant students through the survey has been challenged by language barriers, nonworking phone numbers, and misunderstanding around eligibility requirements.⁶⁷ As a result, immigrant student eligibility may be undercounted, and schools with a high concentration of immigrant students may have an undercalculated community-eligibility rate. Yet despite the risk of error in the UFP’s current survey, particularly for respondents whose primary language is not English or Spanish, the survey method still identifies more eligible immigrants than direct certification because of its statistical correction for error on a local level and the ability to customize the

and Spanish. Their results could be further improved by adding more languages.⁶⁹

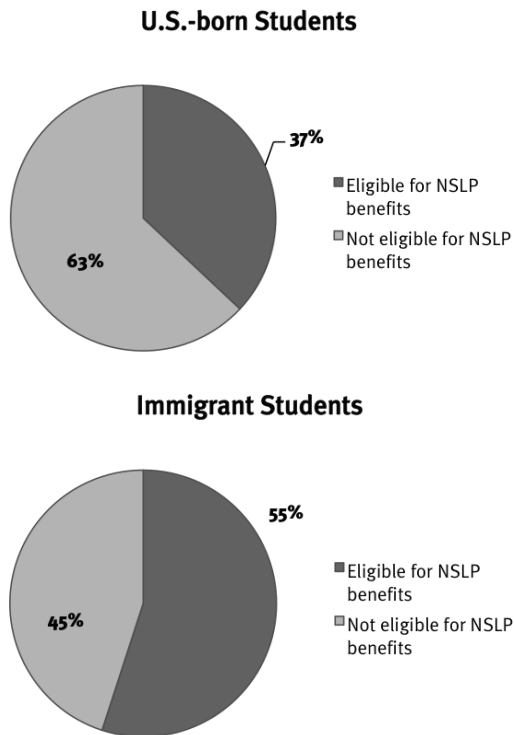
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Even the USDA has confirmed variation across states in its ability to certify students who are categorically eligible for the NSLP through SNAP.

In addition to promoting economies of scale, the survey method offers other advantages over direct certification in terms of cost savings. While elimination of a verification letter in the direct certification process certainly removes a barrier to NSLP benefits, this measure could actually increase costs to school districts with high concentrations of immigrants who underuse SNAP or TANE. Students not directly certified need to submit an application for NSLP benefits, a known barrier to participation that can lead to increased administrative costs, printing costs for lunch tickets, additional staff to collect tickets and money, and verification costs.⁷⁰ Wayne Grasela, director of the food services division for the School District of Philadelphia, expressed his concerns about federal reimbursements in light of such costs:

Once you take into account indirect costs—the cost of labor, operations, etc.—there’s really not much money left over for actual food. It costs 25 cents for a carton of milk, 25 cents for an apple, 15 cents for any other kind of fruit, 10 cents for white bread, 15 to 20 cents for whole-wheat bread . . . that’s not even counting proteins! Out of all of this, I have to try and create a fully reimbursable meal that is nutritious.⁷¹

Figure 2. Free and Reduced Price Lunch Eligibility, by Nativity, 2009;
Source: U.S. Census Bureau



survey to meet local language and cultural needs.⁶⁸ In Philadelphia, for example, the Reinvestment Fund partnered with the School District of Philadelphia to counter the problem by issuing multilingual letters to families about the survey and administering phone surveys in English

As of July 2009, the maximum lunch subsidy rate for contiguous states was \$0.33 for paid meals, \$2.45 for reduced-price meals, and \$2.85 for free meals.⁷² This leaves a very small margin to create meals that students will eat, are nutritious, meet USDA standards, and do not pose significant costs to school districts. The survey method cuts out many of the costs associated with current application models, leaving more funds for food services and food.⁷³

The survey method requires a significant initial investment to administer, but this is later offset by resulting cost savings. The Reinvestment Fund conducted the statistical surveys for the UFP in 1991, 1994, and 2007. The School District of Philadelphia invested \$550,000 in the Fund's data collection and analysis services in 2007, which included an in-person interview component to validate phone survey results.⁷⁴ This initial expenditure often becomes a political breaking point for the survey method and is a main reason no other pilot sites were given an option to replicate the method until the Healthy, Hunger-Free Kids Act.⁷⁵ Politicians find it difficult to justify such a high cost to get results that some argue would not be much different from those generated through direct certification.⁷⁶ Relaying the benefits of a sophisticated statistical method to constituents or other legislators may also not be an easy task.⁷⁷ In addition, such a high initial expenditure negatively impacts the cost-estimate score given to policies by the Congressional Budget Office (CBO), since the CBO does not necessarily calculate longer-term cost savings and nonmonetary benefits that result from initial survey costs.⁷⁸

“ *[E]conomies of scale and the marginal costs associated with charging ineligible students for lunch may actually outweigh the costs involved with providing free meals to the whole school.* ”

In light of such costs, the survey method would not be appropriate for every school district. However, the more racially and economically diverse a district, the less effective a multiplier at the federal level may be at capturing the district's actual need.⁷⁹ Since the survey method corrects direct certification at the local level, it reflects a diverse district's needs more accurately. Despite the initial survey costs, the UFP saved Philadelphia an estimated 20,480 hours of staff time, and the survey method increased the number of students eligible for the NSLP and saved the school district about \$0.19 per meal.⁸⁰

CONCLUSION

The USDA still considers the survey method a pilot, and the Healthy, Hunger-Free Kids Act of 2010 designates funds only for additional pilot replication efforts that would last up to three years in up to three school districts.⁸¹ The survey method removes more barriers to NSLP, potentially decreasing administrative costs for school districts. As a result, social demand for the NSLP will be more accurately met for immigrant students, who are often missed through direct certification and not picked up through the paper application. The survey method corrects direct certification errors on a local level, and this increased accuracy leads to more efficient distribution of NSLP benefits to students and more efficient federal reimbursements to schools.

Ensuring that eligible children are correctly identified and provided with free and reduced-price lunches can have both short- and long-term benefits. Critically, the NSLP helps address short- and long-term physical health disparities resulting from poverty by helping vulnerable families secure adequate food.⁸² In addition, food insecurity can lead to delayed or impaired development, a particularly dire consequence for children.⁸³ One study even found that hunger and risk of hunger among low-income students are correlated with “compromised psychosocial functioning.”⁸⁴ Improvements in nutrient intake are also associated with improvements in academic performance.⁸⁵ Students who reported low nutrient intakes had “lower GPAs and higher rates of absenteeism and tardiness than children from the same schools who reported higher levels of nutrient and energy intake.”⁸⁶ Academic achievement influences educational attainment, which is associated with increased job opportunities and wages that increase income and act as a pathway out of poverty.⁸⁷

In addition, because in-kind meal benefits help meet overall food needs, they provide families with more disposable income to apply to other needs. This type of benefit is critical for families whose income is volatile or have experienced some sort of income shock. The NSLP acts as a safety net that can prevent families from falling even deeper into poverty and can help them transition out of poverty. These measures can also provide more general cost savings to communities at large. Holzer et al. estimate that poverty raises direct expenditures on health care and special education assignment resulting from poverty by about \$26 billion per year, “though this no doubt under-

states the true effects of poverty (as expenditures on Social Security, Disability Insurance, and other categories are omitted here due to lack of estimates).⁸⁸ Indeed, higher rates of morbidity and mortality among those in poverty has an impact on people “above and beyond their effects on medical or education expenditures.”⁸⁹

The NSLP provides a much needed buffer between eligible students and the educational, behavioral, developmental, and health consequences of poverty and food insecurity.⁹⁰ These benefits suggest the need

for certification methods that most accurately identify and enroll eligible students. The 20-year success of Philadelphia’s survey method illustrates the potential for similar cities to use this method in their schools and communities. In light of the proven benefits the survey method provides for needy students, particularly immigrants in or near poverty, Congress should increase the number of school districts permitted to replicate the survey method and extend the three-year timeline, particularly in communities with high concentrations of immigrant students.

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THE EFFECT OF THE GENEROSITY OF WELFARE BENEFITS ON MATERNAL AND INFANT HEALTH AMONG UNMARRIED, LOW-EDUCATED WOMEN

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ABSTRACT The majority of adult welfare recipients in the United States are single mothers, and aspects of welfare policies that affect the health of these women often affect their children's health. Yet there is little empirical analysis of how and to what magnitude welfare benefits influence pregnancy outcomes. This study aims to fill the knowledge gap about the effects of welfare reform on the well-being of single mothers and their children. By creating a variable for generosity of welfare, we examine the bundle of welfare benefits across states and how varying benefits bundles affect prenatal-care utilization and birth weight among low-income, unmarried women from 1996 to 2002. We find that unmarried women, compared to married women, have higher odds of having a low birth weight infant; and infants of unmarried women weigh slightly less than those born to married women. Similarly, unmarried women are much less likely to initiate early prenatal care and have fewer prenatal visits on average. The overarching relationship between welfare generosity and health is complex, and we find inconsistent impacts on maternal and infant health.

INTRODUCTION

Welfare reform in 1996 ushered in an era of more stringent eligibility requirements that sought to decrease welfare rolls. Because many welfare policies were related to childbearing, the policies affected single mothers, who are the majority of adult welfare recipients in the United States. However, little research examines the effects of these policies, which vary by state, on the health of single mothers and their children. To fill this knowledge gap, we use a cross-sectional design to examine the effects of four individual welfare policies and bundles of these policies on low-income, unmarried women. The results of our analysis indicate that generous welfare policies have several significant associations with prenatal-care utilization and birth weight for these women and their infants. Unmarried women have higher odds of having a low birth weight infant compared with married women, and infants of unmarried women weigh slightly less on average than those born to married women. Similarly, unmarried women are much less likely than married women to initiate early prenatal care and have fewer prenatal care visits on average. However, the overarching relationship between welfare and health is complex. Effects of the individual policies and overall welfare generosity level are inconsistent and differ between married and unmarried women.

BACKGROUND AND POLICY CONTEXT

In 1996, President Bill Clinton signed the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) into law and instituted Temporary Assistance to Needy Families (TANF), in an effort to address criticism regarding welfare's failure to move people out of poverty and into steady employment. PRWORA replaced Aid to Families with Dependent Children (AFDC), a grant program established by the Social Security Act of 1935, and emphasized work requirements, job-training programs, and benefit limitations.¹ TANF funds, distributed to states in block grants, included a wide range of provisions designed to support state efforts to help welfare beneficiaries return to work and limit their amount of time on government assistance.

An integral aspect of TANF is the federal distribution of block grants to states. States use TANF dollars to meet four specific federal government-stated purposes: (1) provide assistance to needy families to care for children within their own homes, (2) end dependence on government assistance by promoting a return to work, job preparation, and marriage, (3) prevent and reduce out-of-wedlock pregnancies, and (4) encourage the formation and maintenance of two-parent families.² States use TANF grants for a number of different programs and services, including education and job training, child care, income assistance (wage supplements), transportation, aid to at-risk children, and other services for low-income families. Because states have some latitude in interpreting the objective of TANF grants, welfare policies differ significantly across states. These policies had the intended effect of decreasing welfare caseload, but critics have pointed out that policy variation across states made many low-income women more economically vulnerable.³ The TANF caseload has been trending downward since the early 2000s and increased only modestly during the recent economic downturn from December 2007 to March 2010.⁴

The Deficit Reduction Act of 2005 reauthorized TANF until the end of federal fiscal year 2010.⁵ In November 2010, the House and the Senate extended TANF block grants through the end of 2011, at which time they will be up for renewal. However, the block grant amount has not changed since 1996 and represents a decrease of 28 percent after accounting for inflation.⁶ The supplemental grants, which have been enacted every year since 1996 for states with a low enrollment, have been renewed, but will decrease through June 2011 and will not be available at the end of 2011 unless Congress votes to extend them. In addition, states have new reporting requirements.⁷

LITERATURE REVIEW

Although a large body of literature examines welfare, health, and policy, most research of welfare's effect on women's health tends to address psychological well-being and access to health insurance rather than pregnancy outcomes.⁸ Several studies examine the effects of the 1996 PRWORA and the subsequent reduction of welfare caseload and benefits on vulnerable populations. Using the National Longitudinal Survey

of Youth, Olson and Pavatti report that women on welfare are almost five times as likely as women not on welfare to report that medical problems prevented them from seeking employment.⁹ In a multidisciplinary, longitudinal study in four urban areas, Polit et al. find that women welfare recipients scored lower on a common physical health status scale than nonrecipients, and that one-quarter of the welfare recipient group reported being in fair or poor health, compared with only eight percent of age-matched women nationally.¹⁰

Another recent study investigating poor health status among single, welfare-receiving mothers shows that they bear a heavier burden of illness than a comparison group from a nationally representative sample of women of the same race and age.¹¹ The study finds higher rates of elevated blood pressure, elevated blood sugar, obesity, and smoking, and lower levels of physical functioning and smoking cessation among single mothers receiving cash benefits. More important, the post-TANF welfare group in the study experienced worse health status than a random sample of pre-TANF welfare recipients.

Complicating the situation, other research links welfare reform to lower insurance coverage for this population. A 2008 study finds a “negative effect of welfare enrollment on Medicaid coverage ... and supports prior evidence that welfare reform also reduced access to Medicaid.”¹² While this study suggests increasing and expanding Medicaid may improve pregnancy outcomes, the current trend of decreasing access to public coverage for low-income women continues.¹³ Although several studies confirm that more prenatal care utilization leads to healthier babies,¹⁴ the drop in Medicaid coverage has been associated with a small decrease in first trimester prenatal care initiation.¹⁵

Currie and Grogger’s study finds an increase in welfare caseload to be associated with an increase in the adequacy of prenatal care, initiation of prenatal care in the first trimester, and a decrease in fetal death.¹⁶ However, these changes in caseload do not affect birth weight. Similarly, Joyce et al., in pre- and post-tests with a comparison group, find that welfare reform does not change the rate of low birth weight of infants born to Latina women in New York City, California, and Texas.¹⁷

Perhaps most relevant to our analysis, Kaestner and Lee’s 2005 study analyzes the effect of welfare reform on birth weight and prenatal care utilization.¹⁸ The authors mention several welfare reform-induced changes that may influence these two indicators. Family disposable income, a decrease in Medicaid eligibility, changes in time and money available for health investment, levels of stress, and nutrition all potentially affect birth weight and prenatal care utilization. Kaestner and Lee focus on how a decrease in welfare caseload influences both prenatal care utilization and birth weight.

THEORY AND CAUSAL MODEL

Using Kaestner and Lee’s paper as a model for our research, we sought to answer the following question: Did the generosity of the bundle of welfare benefits across states affect prenatal care utilization and birth weight among low-income, unmarried women from 1996 to 2002?

We examine the cumulative effects of both generous and not generous policies on low-income, unmarried women. We define nongenerous policies to include welfare time limits, stringent family caps, and harsher eligibility and activities requirements. We hypothesize that these components of welfare policy can adversely affect the economic situation and thus the health of a woman; in contrast, we expect to find that more generous policies lead to increased utilization of health care and improved birth outcomes. We choose these welfare policies because: (1) variation exists between states and over time, and we want to study the differential treatment effects on pregnant women, and (2) the policies determine the economic conditions that pregnant women face and affect, directly or indirectly, the women’s health during pregnancy.

We hypothesize that, holding other prenatal risk factors constant, women who were exposed to more generous bundles of welfare policies during this time would use prenatal care more and would have children with higher average birth weight than women in identical situations who were exposed to less generous bundles.

METHODOLOGY

SAMPLE

The study sample consists of full-term, singleton births from low-educated (defined as less than 12 years of education) women ages 20 to 34 from 50 states and the District of Columbia, during the years 1996 to 2002. By limiting the sample to non-high-school-educated women, we attempt to show comparable sociodemographic circumstances. We choose women older than 19 to eliminate young women who may still be on track to complete high school, and we omit women 35 and older because this age group has increased rates of pregnancy and birth complications independent of socioeconomic status. By using deliveries of singleton births, we eliminate any reported cases of low birth weight that were direct results of multiple births. Low birth weight includes all live births weighing less than 2,500 grams as classified by the Centers for Disease Control and Prevention.¹⁹ Also, because preterm birth (gestations less than 37 weeks) is the most common cause of low birth weight, we deemed this a potential confounder and omitted those births from our sample.

Because our data do not contain information on welfare participation, we use marital status as a proxy, as married and unmarried women have different welfare-participation rates, suggesting that welfare policies may affect women differently based on marital status. We use married women as our treatment group and unmarried women as our comparison group.²⁰ Unmarried women have high rates of welfare participation and are therefore more likely to be affected by welfare policies. A 2006 congressional report shows that only 11 percent of adult welfare recipients were married and living together.²¹ Similarly, the Administration for Children and Families separates its caseload not according to marital status but according to two-parent families and one-parent families, with the former comprising less than 10 percent of total families from 1997 to 2004.²² In terms of family composition, women head 90 percent of families who receive welfare benefits.²³

VARIABLES

Dependent Variables. We use two dependent variables for maternal and infant health outcomes: (1) initiation of prenatal care in the first trimester and (2) incidence of low birth weight, a leading cause

of infant morbidity and mortality. We use and analyze the variables in two ways. First, we use them as continuous variables, measuring the total number of prenatal visits in the first trimester and measuring birth weight in grams. Second, we use them as binary variables: (1) one or more prenatal visits within the first 12 weeks of pregnancy is coded as one, and a lack of prenatal visits within the first 12 weeks is coded as zero, and (2) presence of low birth weight at term (an infant born weighing less than 2,500 grams) is coded as one, and high birth weight (greater than or equal to 2,500 grams) at term is coded as zero.

Covariates. For low birth weight, we control for pre-term birth. We include maternal risk factor variables in an attempt to eliminate confounding factors contributing to low birth weight that are independent of the size of government cash grants. These factors include tobacco and alcohol use, race, and other medical risk factors such as diabetes, incompetent cervix, chronic hypertension, and pregnancy-associated hypertension. By including such covariates in

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our analysis, we eliminate them as explanations for the differences between our treatment and comparison group. Finally, we include state and year dummy variables to control for differences between states and over time to eliminate possible confounding factors that are time invariant (i.e., population, per capita income, average size of cash grants per capita).

Primary independent variable. State welfare policies, which determine the size of individual cash grants, are our main independent variable of interest. For a discussion of the four specific policies that we use to define this variable, see the next section, “Generosity of Welfare.”

We create a variable of state welfare policy generosity bundle. First, we create a continuous variable that counts the number of generous policies (i.e., the absence of restrictive policies) in each state, where zero represents the absence of generous policies and four represents the presence of all generous policies. Next, we create a set of dummy variables as follows: no generosity, low generosity, medium generosity, medium-high generosity, and high generosity. For example, a state with one generous welfare policy is considered “low generosity” and a state with four generous welfare policies is considered “high generosity.” “No generosity” is omitted from our regression model and serves as the point of comparison. The dummy variables help us estimate the impact of welfare policies as a package.

GENEROSITY OF WELFARE

Based on policy review and hypotheses about the intersections of economic policy and health, our model for welfare generosity encompasses four key welfare policies: presence of a family cap, eligibility of pregnant women with no other children, time limits, and exemption of pregnant women from activities requirement during any month of her pregnancy. We describe the policies below.

Family cap. Historically, states have increased benefits to welfare recipients after the birth of each additional child. To address the perceived moral hazard that women have additional children in order to increase their welfare payments, some states initiated policies that reduce or eliminate the benefits increase. These family cap policies, first piloted in New Jersey in 1992, aimed to decrease fertility rates among poor women, but its impact has been mixed.²⁴ Existing research does not explore the association of family cap policies to prenatal care utilization and birth. We felt it was important to examine this variable, as it determines the size of the cash grant received by pregnant women on welfare. In our analysis, we code the absence of such a family cap policy as generous.

Time limits. Time limit policies, introduced with welfare reform, terminate or reduce a recipient’s benefits due to the amount of time that they have been receiving assistance. This policy aims to decrease the potential moral hazard of disincentive to work among welfare recipients. The federal government

places a lifetime cap of 60 cumulative months of welfare benefits. States have reacted in different ways to this policy, with some imposing shorter lifetime limits of 21 to 48 months and others exercising the option to exempt up to 20 percent of their caseload from this restriction or distributing noncash assistance in the form of vouchers from state funds to families that have reached the time limit.²⁵ Leonard and Mas found that infant mortality increases when a state enacts time limits and that women affected by time limits are less likely to seek prenatal care in the first trimester.²⁶ We code the absence of such limits as generous.

Activities exemption. A key policy of PRWORA is that welfare recipients are required to work, attend job training, or enroll in educational programs to remain eligible and avoid a sanction. States vary in their activities exemption for pregnant women both in terms of the existence of such an exemption as well as the gestational month when the exemption goes into effect.²⁷ We include activities exemption in our model because long hours of strenuous work activity

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Unmarried women are twice as likely to have no prenatal care during pregnancy when compared to their married counterparts.

has the potential to adversely affect birth outcomes. Dominiques et al. review the literature regarding work activity as a risk for adverse birth outcomes.²⁸ Although they choose preterm birth as their target variable, they find mixed evidence with regard to work environments requiring women to stand for long periods. In another study’s subgroup analysis of women receiving disability benefits, offspring of students and women who worked more than 40 hours a week had significantly lower birth weight than those of women who did not work.²⁹ We code an activities exemption as being generous if a woman is exempted from this requirement in any month of her pregnancy.

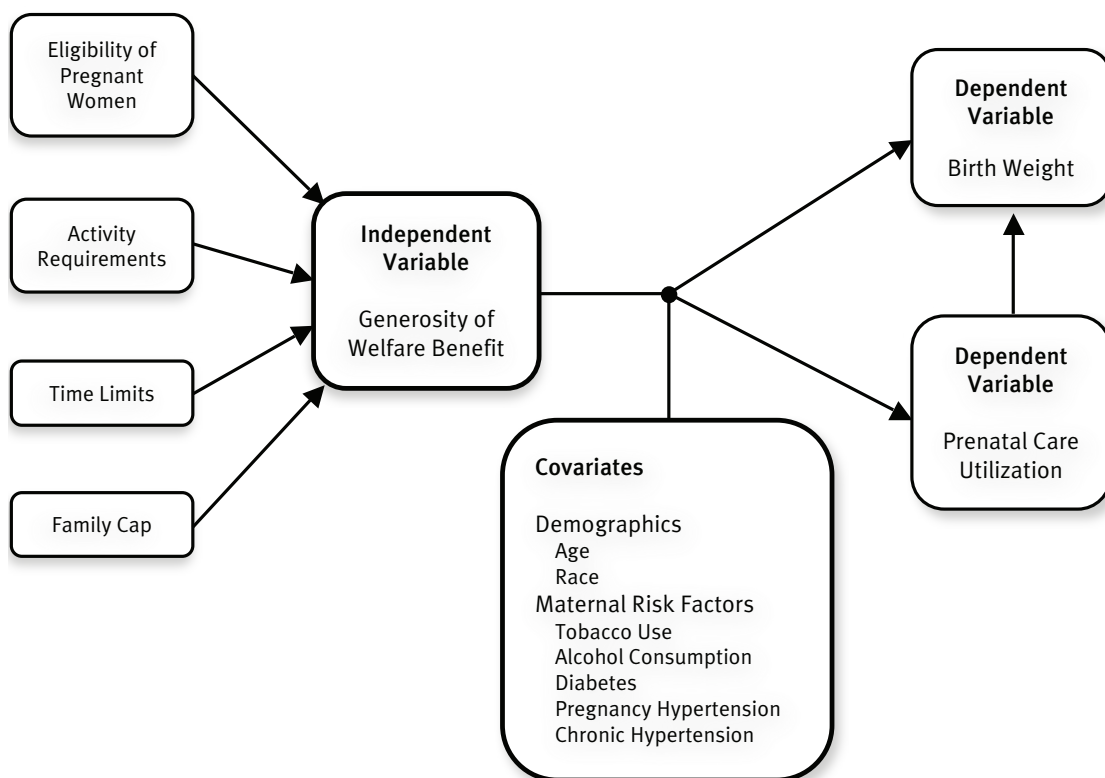


Figure 1 illustrates the components of our generosity of welfare variable, our dependent variables, and the covariates that we hold constant.

Eligibility of Pregnant Women With No Other Children. Under AFDC, states had the option of providing benefits to pregnant women with no other children because the women would otherwise be eligible for benefits if the child were already born and living with her. The existence of this policy varies across states.³⁰ We include this policy in our analysis with the assumption that pregnant women who receive cash benefits will have greater access to nutrition and prenatal appointments. If this eligibility is present, we coded the policy as generous.

STUDY TIME FRAME

Beginning the analysis at 1996 allows us to capture changes in the generosity of state welfare policies that occurred as a direct result of the implementation of PRWORA in August 1996. This sweeping welfare reform legislation increased the complexity of welfare programs' policies and rules, providing states with more control over how they spent federal welfare money.³¹ We choose to end our analysis in 2002 to eliminate bias from the

changes in vital-statistics collection that took place in 2003 and 2004, and because the years 2005 and 2006 failed to include geographical information because of new regulations on privacy restrictions.³²

DATA SOURCES

Our data came from the Natality Detail Files and the Urban Institute's Welfare Rules Database. For a complete list of variables, data sources, and variable types, see table 1. The Natality File is a public-use data file that includes all live births occurring within the U.S. The file does not include births to U.S. citizens living in other countries. This data is obtained from birth certificates in each state through the Vital Statistics Cooperative Program. It includes all states and the District of Columbia.³³ We obtained the Natality Files from the University of Michigan Inter-University Political and Social Research data set collection.³⁴ We extract our population's demographic and health information from the Natality File. Among other variables, these files contain information on pre-

Variable	Type	Source
<i>Dependent Variables</i>		
Low birth weight	Binary/ nominal	Nativity Detail File
Prenatal-care utilization	Binary/ nominal	Nativity Detail File
<i>Independent Variables</i>		
Generosity of welfare bundle	Nominal/ interval	Welfare Rules Database
Family cap	Binary	Welfare Rules Database
Time limits	Binary	Welfare Rules Database
Exemption of activities requirements	Binary	Welfare Rules Database
Eligibility of pregnant women	Binary	Welfare Rules Database
<i>Covariates—Individual</i>		
Marital status	Binary	Nativity Detail File
Race of mother	Nominal	Nativity Detail File
Age of mother	Ordinal	Nativity Detail File
Education of mother	Binary	Nativity Detail File
Diabetes	Binary	Nativity Detail File
Hypertension	Binary	Nativity Detail File
Cigarette use	Interval	Nativity Detail File
Alcohol use	Interval	Nativity Detail File
Plurality	Binary	Nativity Detail File
State and year controls	Binary	Nativity Detail File

Table 1. Variables and data sources

natal care utilization, child characteristics, mother characteristics, medical risks, pregnancy, and delivery history.

Data describing differences in welfare policies across states comes from the Urban Institute’s Welfare Rules Database. The Urban Institute is an independent, nonpartisan institute that gathers data, conducts research, and evaluates programs on social and economic issues. The Institute’s Welfare Rules Database provides a longitudinal account of cash-assistance programs in all 50 states and the District of Columbia by state from 1996 to 2008.

ANALYTIC APPROACH

We first consider the overall impact of aggregate welfare policies by using the welfare policy generosity dummy variables in our regressions. We then estimate the impact of the four individual policies on prenatal care utilization and birth weight. In all models, we include dummy variables for marital status and control for maternal characteristics and health behaviors. We also control for differences between states over time by including state and year dummy variables.

Our first analysis is a logistic regression that estimates the impact of the generosity of welfare policies on presence of low birth weight. We test the hypothesis that generous welfare policies have a negative relationship with low birth weight using the following logistic model (model 1):

$$P(\text{Lowbirthweight}) = F(\alpha + \beta_1 \text{Interact} + \beta_2 \text{MarDummy} + \beta_3 \text{Generosity} + \beta_4 X + S + Y + \varepsilon)$$

For the dependent variable, the value “1” indicates the presence of low birth weight (less than 2,500 grams at birth) and “0” indicates the absence of low birth weight (greater than or equal to 2,500 grams). The model

regresses an interaction term (*Interact*) between two dummy variables: unmarried women (*MarDummy*) and generosity of welfare policies (*Generosity*).

We also use an OLS regression that estimates the impact of generosity of welfare policies on birth weight as a continuous dependent variable (model 2):

$$\text{Birthweight} = \alpha + \beta_1 \text{Interact} + \beta_2 \text{MarDummy} + \beta_3 \text{Generosity} + \beta_4 X + S + Y + \varepsilon$$

Next, we estimate the impact of generosity of welfare policies on prenatal-care visits by individual mothers within a given year. We use the following logistic regression with prenatal visits as a binary variable (model 3):

$$P(\text{Prenatalvisits}) = F(\alpha + \beta_1 \text{Interact} + \beta_2 \text{MarDummy} + \beta_3 \text{Generosity} + \beta_4 X + S + Y + \varepsilon)$$

For the dependent variable, a value of “1” indicates that mothers initiated prenatal care in the first trimester, and “0” indicates that mothers started care after 12 weeks or not at all. Like model 1, we create an interaction term (*Interact*) that interacts unmarried women and generosity of welfare policies.

Finally, we use prenatal visits as a continuous variable where *Visits* represents total number of prenatal visits during pregnancy (model 4):

$$\text{Visits} = \alpha + \beta_1 \text{Interact} + \beta_2 \text{MarDummy} + \beta_3 \text{Generosity} + \beta_4 X + S + Y + \varepsilon$$

RESULTS

DESCRIPTIVE STATISTICS

Table 2 describes the characteristics of married and unmarried mothers, for which all differences are significant at the one percent error level. Out of a sample of 3,051,007 women, 51.9 percent are married, and 48.1 percent are not. Black mothers are the only women in the sample who are more likely to be unmarried—10.6 percent unmarried compared to 2.1 percent married. Hispanics, whites, and mothers of other races are more likely to be married than unmarried. Hispanic mothers make up about half of the sample, and about half the sample is between the ages of 20 and 24. Of that age bracket, 29.1 percent are unmarried. Only 13 percent of women ages 25 to 29 and 6 percent of women ages 30 to 34 are single.

Some maternal health indicators in the sample vary extensively by marriage status. For example, married women are more likely to abstain from alcohol during pregnancy, and unmarried women are twice as likely as nonmarried women to consume at least one alcoholic drink per week during pregnancy (and five times as likely to consume three to four drinks per week). Unmarried women are also more likely to be smokers: twice as likely to smoke five cigarettes per day, almost twice as likely

to smoke 10 cigarettes per day, and less likely to be nonsmokers in general (27.6 percent of unmarried women are nonsmokers, compared with 31.8 percent of married women). Most important, unmarried women are twice as likely to have no prenatal care during pregnancy compared with their married counterparts (1.3 percent versus 0.7 percent). Despite generally poorer pregnancy indicators, nonmarried women have lower rates of diabetes.

Some health factors, though statistically different given our large sample size, were similar between unmarried and married women. Rates of pregnancy hypertension and chronic hypertension were at 1.1 percent and 0.2 percent respectively. Married and unmarried women were also about as likely to be nonsmokers. With regard to infant health, unmarried women were more likely to have low birth weight infants—1.9 percent compared with 1.3 percent of married women.

MULTIVARIATE REGRESSIONS AND MULTICOLLINEARITY

To ensure that health risk predictors in our models are not highly correlated, we conduct bivariate correlation to test for multicollinearity between variables. We find low correlation between chronic hypertension and diabetes ($r = 0.004$), indicating no collinearity between the variables. We run the same correlations

Variable	Total	Married	Unmarried
<i>N</i> (%)	3,051,007	51.9	48.1
<i>Health Indicators</i>			
Maternal (%)			
Pregnancy hypertension	66,340	1.1	1.1
Chronic hypertension	11,799	0.2	0.2
Diabetes	74,665	1.4	1.0
Nonsmoker	1,812,877	31.8	27.6
Smoker (five cig. per day)	116,752	1.2	2.6
Smoker (10 cig. per day)	200,449	2.6	4.0
Smoker (20 cig. per day)	144,831	2.1	2.7
Smoker (40 cig. per day)	21,987	0.3	0.4
Smoker (41 or more cig. per day)	913	0.01	0.02
Nondrinker	2,360,292	39.1	38.3
Drinker (one drink per week)	8,628	0.1	0.2
Drinker (two drinks per week)	4,341	0.03	0.1
Drinker (three to four drinks per week)	3,120	0.02	0.1
Drinker (more than five drinks per week)	4,467	0.03	0.1
Saw doctor during first trimester	2,093,185	37.3	31.3
Saw doctor during second trimester	655,168	10.3	11.2
Saw doctor during third trimester	163,224	2.4	3.0
No prenatal care	60,401	0.7	1.3
Infant (%)			
Low birth weight	97,873	1.3	1.9
<i>Demographics</i>			
Race/ethnicity (%)			
Black	388,003	2.1	10.6
Hispanic	1,549,233	29.5	21.3
White	971,897	17.5	14.3
Other	120,429	2.5	1.5
Age (%)			
20-24	1,576,514	22.6	29.1
25-29	950,724	18.2	13.0
30-34	523,769	11.1	6.0

All differences are significant at $p < 0.01$.

Table 2. Descriptive statistics: Characteristics of unmarried and married women

between chronic and pregnancy-induced hypertension and find no correlation ($r = 0.000$). We conclude that multicollinearity is not present and keep all original variables in our fully specified model.

IMPACT OF WELFARE GENEROSITY ON LOW BIRTH WEIGHT

When we regress birth weight as a continuous variable on welfare generosity as a continuous variable (table 3), we find a significant positive effect on birth weight for unmarried women. We find unmarried women have babies that weigh 36.9 grams less on average

compared with those of married women. When we regress welfare generosity coded as dummy variables to examine how each level of generosity affects our outcome, we find that as the level of generosity increases, birth weight also increases, but this interaction is significant only at the medium-high generosity level (table 3). Examining individual generosity dummies on birth weight produced several significant results. Unmarried women with low generosity have 9.3 percent higher odds of delivering a low birth weight infant, compared with married women and women with other bundles of welfare generosity.

Variable	OLS coefficients (standard errors): Birth weight		Logistic odds ratios: Low birth weight	
	(1)	(2)	(1)	(2)
Unmarried*low generosity	-0.671 (2.274)		1.093**	
Unmarried*medium generosity	0.444 (2.346)		1.066**	
Unmarried*medium high generosity	6.799** (2.410)		1.084**	
Unmarried*high generosity	-1.054 (3.015)		1.144**	
Unmarried*generosity		1.621** (0.524)		1.014*
Generosity		-2.871*** (0.674)		1.003
Low generosity	-9.286** (2.989)		1.027	
Medium generosity	-11.446** (3.236)		1.037	
Medium high generosity	-15.976*** (3.476)		1.039	
High generosity	-16.55*** (3.997)		1.038	
Unmarried	-35.159*** (2.112)	-36.887*** (1.113)	1.135**	1.195*
Constant	3,280.118*** (9.004)	3,278.242*** (8.914)	—	—
R^2	0.051	0.052	—	—
N	3,050,024	3,050,024	3,050,024	3,050,024

All specifications include individual level covariates and dummies for state and year.

* $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$

Table 3. Estimated impacts of welfare generosity on birth weight

IMPACT OF INDIVIDUAL WELFARE POLICIES ON LOW BIRTH WEIGHT

When we examine the impact of each individual policy on birth weight, we find unmarried women exposed to generous time limits give birth to infants that weigh 3.3 grams less than infants born to married women or unmarried women exposed to time limits (table 4). However, other findings are conflicting: infants born to unmarried women in states with generous family cap or pregnancy-eligibility policies weigh on average 5.4 grams and 6.6 grams more respectively, com-

pared with the infants of married women in the same states and women in states without these specific policies.

We also find that unmarried women exposed to a generous family cap policy have 3.5 percent lower odds of having an infant weighing less than 2,500 grams compared with married women and women exposed to a family cap policy. Unmarried women exposed to a generous pregnancy-eligibility policy have 6.2 percent higher odds of having a low birth weight infant compared with

Variable	OLS coefficients (standard errors): Birth weight	Logistic odds ratios: Low birth weight
	(1)	(2)
Unmarried	-40.127*** (1.332)	1.174**
Unmarried*family cap	5.360*** (1.177)	0.965**
Unmarried*time limits	-3.321** (1.562)	1.014
Unmarried*eligibility	6.602*** (1.280)	1.062**
Unmarried*activities requirements	-0.411 (1.354)	1.044**
Family cap	0.554 (1.696)	1.005
Time limits	-3.515** (1.558)	1.000
Eligibility	-12.933** (4.946)	0.995
Activities requirements	-2.968** (1.439)	1.003
Constant	3,281.480*** (8.959)	—
R^2	0.052	—
N	3,050,024	3,050,024

All specifications include individual level covariates and dummies for state and year.

* $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$

Table 4. Estimated impacts of welfare policies on birth weight

married women and women not exposed to pregnancy eligibility (table 4).

IMPACT OF WELFARE GENEROSITY ON PRENATAL CARE UTILIZATION

When using welfare policy generosity as a continuous variable (table 5), we find unmarried women overall have approximately 0.5 fewer prenatal visits compared with married women. When the generosity variable is interacted with marital status, this relationship results in 0.05 more visits for unmarried women overall. We also measure generosity coded with dummy variables (table 5). When considering the impact of welfare generosity, we find unmarried women

with medium generosity of welfare benefits have the greatest marginal increase in prenatal visits compared with married women. We estimate the odds of initiating prenatal care in the first trimester using logistic regression analysis (table 5) and find that each additional generous policy decreases the odds of initiating prenatal care in the first trimester by 8.7 percent. Regressing the level of generosity as dummy variables (table 5) suggests that unmarried women exposed to low, medium, medium-high, and high generosity of welfare policies had 2.5 percent, 23.1 percent, 9.9 percent, and 14.6 percent higher odds of starting prenatal care in the first 12 weeks compared with married women.

Variable	OLS coefficients (standard errors): Number of prenatal care visits		Logistic odds ratios: Initiation of prenatal care in first trimester	
	(1)	(2)	(1)	(2)
Unmarried*low generosity	0.060** (0.020)		1.025**	
Unmarried*medium generosity	0.300*** (0.021)		1.231**	
Unmarried*medium high generosity	0.143*** (0.022)		1.099**	
Unmarried*high generosity	0.168*** (0.027)		1.146**	
Unmarried*generosity		0.052*** (0.005)		1.042**
Generosity		-0.198*** (0.006)		0.913**
Low generosity	0.055** (0.027)		0.960**	
Medium generosity	-0.227*** (0.029)		0.815**	
Medium high generosity	-0.309*** (0.031)		0.815**	
High generosity	-0.555*** (0.036)		0.725**	
Unmarried	-0.591*** (0.019)	-0.540*** (0.010)	0.693**	0.708**
Constant	11.135*** (0.079)	11.191*** (0.078)	—	—
R^2	0.048	0.048	—	—
N	2,936,843	2,936,843	2,971,978	2,971,978

All specifications include individual level covariates and dummies for state and year.

* $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$

Table 5. Estimated impacts of welfare generosity on prenatal care utilization

IMPACT OF INDIVIDUAL WELFARE POLICIES ON PRENATAL-CARE UTILIZATION

Examining the impact of each welfare policy independently produces statistically significant, though inconsistent, effects on prenatal care utilization (table 6). Unmarried women exposed to a generous family cap policy have 0.3 more prenatal visits than married women and women not exposed to a generous family cap policy. Similarly, unmarried women who experience generous pregnancy-eligibility requirements have 0.1 more visits than married women who don't experience such policies. In contrast, we find a statis-

tically significant negative association between both generous time limits and activities exemptions with prenatal-care visits. Finally, we report our findings of the odds of initiating prenatal care in the first trimester. We find unmarried women exposed to a generous family cap policy (i.e., no family cap) have 22.1 percent higher odds of starting care earlier compared with married women and women exposed to a family cap policy. On the other hand, longer time limits and the presence of activity exemptions decrease the odds of unmarried pregnant women getting early prenatal care compared with married women and those in other states without generous policies.

Variable	OLS coefficients (standard errors): Number of prenatal care visits (1)	Logistic odds ratios: Initiation of prenatal care in first trimester (2)
Unmarried	-0.585*** (0.012)	0.688**
Unmarried*family cap	0.330*** (0.012)	1.211**
Unmarried*time limits	-0.053*** (0.014)	0.926**
Unmarried*eligibility	0.117*** (0.011)	1.059**
Unmarried*activities requirements	-0.192*** (0.012)	0.958**
Family cap	-0.327*** (0.015)	0.826**
Time limits	-0.194*** (0.014)	0.968**
Eligibility	-0.014 (0.044)	0.937**
Activities requirements	-0.057*** (0.013)	0.958**
Constant	11.193*** (0.078)	—
R^2	0.048	—
N	2,936,843	2,971,978

All specifications include individual level covariates and dummies for state and year.

* $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$

Table 6. Estimated impacts of welfare policies on prenatal care utilization

DISCUSSION

Unmarried women have higher odds than married women of having a low birth weight infant, and their infants weigh slightly less than those born to married women. Similarly, unmarried women are much less likely than married women to initiate early prenatal care and have fewer visits on average. Our results show that generous welfare policies have several significant associations with prenatal care utilization and birth weight for unmarried women and their infants. The overarching relationship, however, is complex, as we have inconsistent findings with regard to the individual policies and overall levels of generosity.

ANALYSIS OF WELFARE POLICY FINDINGS

We review each welfare policy individually for its effect on prenatal care and birth weight, holding the other policies constant. On average, when an unmarried woman is exposed to a generous family cap policy, there is a small increase in her baby's actual birth weight and a corresponding decrease in the odds of it having low birth weight. Likewise, a generous family cap policy, more than other policies, is associated with an increase in the odds that unmarried women start early prenatal care and increase the number of prenatal care visits. We hypothesize that this effect is actually understated for two reasons. First, to simplify our model, we coded the absence of a

family cap policy as being generous, and every other family cap policy—regardless of whether it goes into effect with the second or 10th child—as not generous. Binary coding may have oversimplified our analysis. Second, a family cap does not deny additional income support to poor women until they have reached the cap limit. For example, if a state caps its benefits at two children, benefits restriction happens when the third child is born, so a family cap should not affect the prenatal care and birth weight of the third child.

The measured effect of the pregnancy-eligibility policy on birth weight, however, is mixed. Though we find a small increase in actual birth weight on average when unmarried women are subjected to this policy, they have slightly higher odds than married women of delivering a baby that weighs less than 2,500 grams. The policy's association with prenatal care, however, is consistent and positive. Indeed, the presence of this policy is estimated to have a positive influence on initiating prenatal care in the first trimester, and it is associated with an increase in the total number of prenatal care visits among unmarried women.

Contrary to our expectations, when unmarried women are exposed to a generous time-limit policy (i.e., the absence of time limit), they give birth to infants that weigh slightly less than those of married women and unmarried women not exposed to the policy. Generous time limits also have a negative effect on prenatal care initiation, with lower odds of late care-seeking and fewer visits.

We also find a negative effect with regard to the activities exemption for pregnant women on prenatal care utilization and birth weight. Unmarried pregnant women exposed to an activities exemption have slightly lower odds of starting prenatal care in the first trimester and fewer prenatal visits. The effect on birth weight was similar: unmarried women exposed to a generous activities-exemption policy have slightly higher odds of having a low birth weight baby than married women and unmarried women not exposed to this policy. We predicted that the presence of an activities exemption for pregnant women would allow them to work less and facilitate compliance with prenatal care appointments, leading to higher birth weight. We do not have a clear explanation for the negative association, and we did not come across analysis of this policy in our literature review.

ANALYSIS OF WELFARE GENEROSITY FINDINGS

In states with medium-high generosity bundles, we find inconsistent results with regard to birth weight. We find a slight increase in average birth weight of infants born to unmarried women compared with married women and unmarried women without this level of generous policies. However, the babies born to women exposed to medium-high generosity bundles actually have slightly higher odds of being born with a low birth weight. Although there is no statistically

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Our results show that generous welfare policies have several significant associations with prenatal care utilization and birth weight for unmarried women and their infants.

significant effect on actual birth weight for the other levels of generosity, the odds of delivering a low birth weight baby are significant for unmarried women exposed to all levels of generosity, compared with married women and unmarried women not exposed to that respective level of generosity. This is the opposite of what we expected. Perhaps unmarried women in states with high generosity policies have different demographics or health conditions that are not captured in our model. Kaplan notes that women on welfare bear a heavier burden of illness compared with an age-and-race-matched comparison group,³⁵ and Polit et al. note that female welfare participants are more likely to report being in fair or poor health compared with age-matched women nationally.³⁶

All levels of generosity above the no generosity level have a significant positive impact on prenatal care utilization among unmarried women compared with married women and unmarried women experiencing nongenerous welfare policies. We find this trend with the odds of initiating early prenatal care and the average number of visits. Models using welfare policies as a continuous variable have

similar results. These findings are consistent with our initial hypothesis.

Several covariates are worth noting, as their estimates on our two target variables are quite strong. Tobacco use and alcohol consumption are highly correlated with delayed initiation of prenatal care and low birth weight and have coefficients much higher than any of the estimated effects of the welfare policies. Race is also noteworthy. Hispanic, black, and other races are associated with less prenatal care use and low birth weight. Women with diabetes have infants with higher birth weight than women without diabetes. This is expected from a physiological perspective because a fetus secretes more insulin, which has a growth-hormone-like effect, in response to the mother's elevated blood sugar. Diabetes is also associated with an increased number of prenatal visits and initiating care in the first 12 weeks, as more frequent testing is necessary. Hypertension is negatively associated with birth weight, which is expected given its effect on the placenta, and is positively associated with both initiation of prenatal care in the first trimester and the number of prenatal care visits.

STRENGTHS AND LIMITATIONS

LIMITATIONS

The first limitation of our analysis is the distinction between clinical and statistical significance. Given our large sample size, even small average changes in prenatal care and particularly birth weight appear significant at a statistical level. Some of these variations, however, remain too small to be noteworthy from a clinical perspective. For example, the average birth weight of an infant born in the U.S. is about 3,500 grams, so a six-gram difference between our groups is a variation of only 0.2 percent, which is unlikely to have real-world meaning. Regardless, we feel that these changes are indicative of important differences in access to care that women on welfare experience and remain useful at a policy-implementation level.

Our model is unable to control for potentially important confounders. States vary in both their Medicaid-eligibility criteria and availability of funding to pay for medically necessary abortions, so low-income women who may have otherwise chosen to terminate a pregnancy are often unable to do so. Also, whether or not a pregnancy was wanted could affect whether a woman seeks prenatal care and other pregnancy behaviors that may affect birth weight.

Our use of marital status as a proxy for welfare participation is another potential limitation. Almost certainly some married women in the comparison group received welfare benefits and some of the single women did not. As a result, our effects are likely underestimated for the target group.

In addition, our model is oversimplified by using binary welfare generosity variables; our model does not capture the nuances within and between state policies. We attempt to identify the four most important policies that affect overall economic status, but welfare variables not included in our model may affect our outcomes of interest. Our analysis does not capture additional services and cash-assistance programs that women may receive, such as child care subsidies; food stamps; Women, Infants, and Children; the Earned Income Tax Credit; and other pregnancy-targeted health programs. Similarly, we measure the impact of the policies' presence, not whether the policies affect a specific individual. As such, we have likely underestimated individual and cumulative policy effects on individual women.

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A generous family cap policy, more than other policies, is associated with increase in the odds that unmarried women start early prenatal care and increase the number of prenatal care visits.

Finally, we limit our data collection to seven years, from 1996 to 2002. Ideally, including data prior to the implementation of these policies would have strengthened our analysis, as it would have allowed us to do a difference-in-differences model.

INTERNAL AND EXTERNAL VALIDITY

Despite these limitations, our study contributes to a body of empirical evidence to better inform the effects of welfare policies on the reproductive health of an understudied population. We gathered more than 3 million observations from the Natality Detail Files and included every eligible

individual from ages 20 to 34; therefore, we are not concerned about threats to external validity

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In light of the November 2010 TANF reauthorization, we can use this analysis of reproductive health outcomes to learn from and improve upon future welfare reforms. This study is particularly relevant during the current time of recession, when children and low-educated women are more vulnerable to economic hardship.

for this age group during this period of time. Of course, as legislation and economic conditions have changed, temporality may be a threat to external validity. Because the method of birth certificate documentation is consistent throughout the collection time period and across states, our study does not face threats of testing or instrumentation bias.

REGRESSION TECHNIQUES

We use sophisticated measurement techniques to test the robustness of our results. We choose two dependent variables, birth weight and prenatal care utilization, both of which are key indicators of health status among low-income, unmarried women. We are able to analyze prenatal care and birth weight outcomes from different perspectives by using OLS and logistic regressions and by using the dependent variables as continuous and binary variables. We are also able to isolate the impact of welfare generosity on pregnant women with our different welfare-policy variables. Additionally, we include several covariates, including several high-risk health factors, to strengthen our causality argument.

We caution that logistic regressions yield odds ratios, which are approximate ratios that show relative measures of impact between groups. Odds ratios have the disadvantage of overstating the effect of common outcomes.

CONCLUSIONS AND POLICY IMPLICATIONS

Our results show several statistically significant relationships between generosity of welfare, prenatal care utilization, and birth weight. Compared with married women, unmarried women have lower birth weight infants, and they are less likely to initiate early prenatal care and attend prenatal visits. Our analysis of individual welfare policies and overall level of generosity shows inconsistent effects, illustrating difficulties in understanding and accounting for variation in different welfare policies.

Regardless, this study provides empirical information about the complicated relationship between welfare and health. In light of the November 2010 TANF reauthorization, we can use this analysis of reproductive health outcomes to learn from and improve upon future welfare reforms. This study is particularly relevant during the current time of recession, when children and low-educated women are more vulnerable to economic hardship. Currently, single mothers face higher rates of unemployment and poverty rates surpassing 40 percent.³⁷ The benefit levels of TANF are 75 percent of the poverty level in 47 states.³⁸ This illustrates the disconnect between the economic needs of vulnerable populations and welfare benefits.

There are several ways that this paper might inform future research and policymaking. First, it illustrates the need for more comprehensive and in-depth measures to evaluate welfare programs. Second, it points out the need for possible tracking and collecting of welfare information on government records. This could assist government officials and policymakers in accurately assessing the impact of cash-welfare programs and provide additional, valuable data on trends of women participating in welfare. We encourage future research to address both the economic and health care realities of vulnerable populations and shed light on the relationship between women's health and government assistance.

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IMPROVING THE NYPD'S PERFORMANCE MANAGEMENT SYSTEM BY MEASURING LEGAL CYNICISM

AMALEA SMIRNIOTOPOULOS

ABSTRACT

The New York City Police Department (NYPD) has been widely praised for its use of a sophisticated performance management system, CompStat, to monitor performance, allocate resources, and test strategies for reducing crime. Lured by claims that CompStat is the key to crime reductions, police departments nationwide have implemented similar performance management systems, and a growing literature has developed around police performance management. However, because CompStat does not capture essential data on legal cynicism, the NYPD continues to pursue policing strategies, such as stop-and-frisks, that severely corrode police-community relations. The NYPD should adopt new performance measures that attempt to gauge police-community relations in order to provide the NYPD with a more accurate picture of its effectiveness.

INTRODUCTION

The New York City Police Department (NYPD) has been widely praised for its use of a sophisticated performance management system, CompStat, to monitor performance, allocate resources, and test strategies for reducing crime. Many regard CompStat as “setting the standard for police management generally, and particularly for the use of performance measurement in systems of internal accountability.”¹ Lured by claims that CompStat is the key to crime reductions, police departments nationwide have implemented similar performance management systems,² and a growing literature has developed around police performance management.

However, contrary to best practices, the NYPD’s CompStat system still relies on traditional measures of police effectiveness, such as crime rates, arrest rates, and stop-and-frisk rates. Because it focuses exclusively on this narrow set of results, CompStat fails to capture other information that could provide necessary feedback on the effectiveness of NYPD strategies. Research has shown that community perceptions of the police and the legitimacy of the criminal justice system as a whole have a significant effect on law-abiding behavior. When people perceive that law enforcement is illegitimate—i.e., when they exhibit legal cynicism—they are less likely to obey the law.³ Because CompStat does not capture essential data on legal cynicism, however, the NYPD continues to pursue policing strategies, such as stop-and-frisks, that severely corrode police-community relations. The NYPD should adopt new performance measures that attempt to gauge police-community relations in order to provide the department with a more accurate picture of its effectiveness.

THE NYPD’S PERFORMANCE MANAGEMENT SYSTEM FAILS TO MEASURE LEGAL CYNICISM

THE PROCESS OF POLICING CAN INCREASE LEGAL CYNICISM, AFFECTING CRIME RATES

For nearly 40 years, criminologists have argued that community perceptions of the legitimacy of the criminal justice system can affect crime rates by changing community compliance with the law. Extensive empirical research has shown that compliance with the law is correlated with the perceived legitimacy of the law.⁴ In other

words, “individuals are more likely to obey the law when law enforcers treat them ... in ways that they identify as neutral, rather than discriminatory.”⁵ By contrast, “if individuals presume that the law is unavailable or unresponsive to their needs,” it will push individuals to “engage in their own brand of social control” through violence.⁶ In his landmark work, Tyler interviewed 1,575 Chicago residents about their own law breaking and their perceptions of the criminal justice system, including the police.⁷ Tyler found that individuals’ perception that the criminal justice system was illegitimate was correlated with the frequency with which they committed minor offenses, such as driving above the speed limit.⁸ Recent research by Kirk and Papachristos similarly found that differences in legal cynicism explained variations in homicide rates among Chicago neighborhoods in the 1990s.⁹

The police, in particular, have a significant impact on community perceptions of the legitimacy of the criminal justice system. The police are the only actors that routinely interact with all of the stakeholders in the criminal justice system (offender, victim, and community) before, during, and after the commission of a crime. As such, the “most visible injustices occur in policing.”¹⁰ Research has shown that how individuals felt that they were treated by the police was one of the most significant influences on their evaluation of their experience in criminal court.¹¹ As Gau and Bronson note, “It is, therefore, not enough for police to plow headlong into their law-enforcement mission—they must also consider the evenhandedness with which they execute their duties. Failure to do so has the potential to reduce their legitimacy and ultimately undermine their capacity to influence citizens’ behavior and effectively control crime.”¹²

THE NYPD’S PERFORMANCE MANAGEMENT SYSTEM DOES NOT MEASURE LEGAL CYNICISM

The NYPD currently relies on a “results-oriented” management system, CompStat, to monitor police performance at the precinct level. CompStat was created in 1994 by then NYPD Commissioner William Bratton in order “to gather and disseminate information on NYPD’s crime problems and track efforts to deal with them.”¹³ CompStat combines regular meetings of key law-enforcement personnel with a computer system that compiles data on crime statistics.¹⁴ Precinct commanders are then held accountable for the crime statistics in their community at regular CompStat meetings.¹⁵ These meetings have been described as “tough, probing sessions” in

which the department's top executives quiz commanders about their use of particular policing techniques,¹⁶ "their analyses of patterns and trends, about their actions to solve crime problems, and about their coordination with other police department units."¹⁷ The goal of CompStat is both to measure the outcomes of police practices and to use data to "manag[e] for improved outcomes."¹⁸ By computerizing daily crime statistics, CompStat allows NYPD commanders to monitor, in real time, whether its crime-control initiatives succeed or fail.¹⁹ Research has shown that the CompStat system has great behavioral power,²⁰ affecting how precinct commanders manage their commands.

Unfortunately, CompStat focuses on these crime statistics to the exclusion of other important data, particularly data on police-community relations. While information about civilian complaints and patterns of police misconduct were included in precinct commander profiles and discussed in CompStat meetings under Commissioner Bratton, it is unclear how or how often this data was collected.²¹ Moreover, even under Commissioner Bratton, these issues did "not receive the same level of attention by the [NYPD]—nor certainly by the Mayor—given to crime."²²

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Compstat's use of high-tech, sophisticated computer systems masks its fundamental reliance on old-fashioned performance measures like crime and arrest rates.

CASE STUDY: STOP-AND-FRISKS

The limitations of CompStat's myopic focus on traditional measures of police performance is demonstrated by the recent controversy over the NYPD's reliance on stop-and-frisks as a method of controlling crime. Because CompStat focuses on factors such as crime rates, it fails to capture the corrosive effect of stop-and-frisks on police-community relations, preventing the NYPD from weighing its true costs and benefits.

The NYPD uses CompStat to monitor the number of stop-and-frisks in a given precinct,²³ believing that

stop-and-frisks deter people from carrying weapons²⁴ and may reduce violent crime.²⁵ At CompStat meetings, the number of stop-and-frisks is compared with crime rates in a precinct, and the location and timing of stop-and-frisks is compared with the place and time of crimes.²⁶ The NYPD also sets productivity goals for individual officers.²⁷

As with other performance management schemes, what gets measured gets done. The NYPD's focus on stop-and-frisks as a crime-reduction strategy has led its officers to stop an increasing number of New Yorkers in recent years, particularly New Yorkers of color.²⁸ During the first months of 2010, 149,753 New Yorkers were stopped by the NYPD.²⁹ Approximately 87% were innocent of any illegal conduct.³⁰ The overwhelming majority of those stopped were black (53%) and Latino (32%).³¹ These stops are also concentrated in particular communities: in Brownsville, Brooklyn, for example, the police stopped 93 out of 100 residents in the past four years.³²

Regardless of the cause of this disparate impact,³³ the frequency of the stops has seriously corroded police-community relations. As Gau and Brunson found in their study of St. Louis youth, "widespread stop-and-frisks can ... undermine police legitimacy."³⁴ The youth they interviewed "characterized their experiences with the police as often constituting harassment."³⁵ Anecdotal evidence suggests that stop-and-frisks in New York have similarly increased legal cynicism in affected New York communities. In one video, several Brownville residents described that "the police have a generalization of black men" and one complained, "I simply can't just walk down the street without being accused for something I have nothing to do with."³⁶ Yet CompStat fails to measure the negative impact of the stop-and-frisk strategy on police-community relations.

THE NYPD'S PERFORMANCE MANAGEMENT SYSTEM DOES NOT FOLLOW BEST PRACTICES

CompStat's narrow focus on crime statistics and similar output measures does not comport with current best practices for police performance management. Academic literature on policing has increasingly focused on the need for police departments to build a strong relationship with the community in order to

make enforcement efforts more effective, to prevent crime, and to make the community co-producers of justice.³⁷ As early as 1997, a group of police executives convened by the National Institute of Justice produced a white paper summarizing new directions for police performance measurement, including citizen satisfaction.³⁸ While CompStat is the model of an effective performance management system, the data it collects is insufficient to accurately gauge the effectiveness of NYPD strategies.

Traditionally, police performance measures have focused on four key statistics: reported crime rates, overall arrests, clearance rates, and response times.³⁹ Yet performance measurement systems based solely on “response times, clearance rates, and numbers of arrests ... prevent police organizations from moving toward a strategy of community problem solving as there is no way to hold police departments externally accountable for addressing community concerns....”⁴⁰ Like other public managers, “police managers should not restrict themselves to simply one outcome measure to use as the bottom line for policing”⁴¹ and should “pay attention to output and process as well as outcomes.”⁴²

In order to effectively focus on community needs, police must incorporate community-based measures of performance. Alpert and Moore advocate for police departments to develop methods to “solicit information from members of the community,” such as using “community surveys to determine attitudes and suggestions concerning the police and the police role.”⁴³ The ideal performance measurement system should express the substantive values of the community, including “reducing fear/enhancing individual security; ... using force and authority economically and fairly; and ... maintaining customer satisfaction.”⁴⁴

Drawing on these best practices, police departments in other jurisdictions have experimented with new performance metrics that better capture police-community relations. While the most common police performance measurement systems “capture the extent, nature, and effectiveness or proactive problem-solving initiatives,” many departments are also using surveys to capture data on criminal victimization, police encounters, and community perceptions of the police, among other variables.⁴⁵ For example, the Lowell, Massachusetts, police depart-

ment has combined a CompStat-like system of performance management with information on citizen complaints.⁴⁶

To date, the Chicago Internet Project has made the most comprehensive attempt to use community-satisfaction measures to evaluate police performance. However, in their evaluation of the project, Rosenbaum et al. found mixed results. The evaluation sought to determine whether a comprehensive, Web-based community survey could be successfully implemented and what effects collecting and reporting this data would have on participant per-

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Publicizing these new measures would allow New York residents and community organizations to monitor the police and apply pressure to the mayor or the NYPD Commissioner if necessary.

ceptions of the police and the community.⁴⁷ While the researchers concluded that they were successful in implementing and collecting accurate results from the survey, they found that the survey did not change participants’ opinions about the police or the community.⁴⁸

This study had several notable limitations that should be considered in interpreting the results. First, the survey targeted more affluent beats in the city, as “a larger percentage of economically disadvantaged residents do not have computers or access to the internet.”⁴⁹ Although the researchers sought to control for other demographic characteristics, such as race,⁵⁰ the deliberate skewing of the sample may have excluded the low-income communities that are often most affected by crime. Second, there were significant implementation problems, most notably that individual police officers failed to inform individuals about the survey or to lead discussions about the results as they were supposed to.⁵¹ Third, the survey results were not incorporated into a comprehensive, CompStat-style performance management system but were merely

discussed at beat meetings with Chicago Alternative Policing Strategy participants.⁵² This may have diminished the impact of the survey results, as officers were not held accountable for these results in any way.

THE NYPD SHOULD IMPLEMENT NEW MEASURES OF POLICE-COMMUNITY RELATIONS TO PROVIDE A MORE ACCURATE PICTURE OF POLICE PERFORMANCE

The current limitations of CompStat does not mean that the NYPD should abandon the system altogether. CompStat is a highly effective performance management system, insofar as it includes several key characteristics that allow it to affect internal behavior. First, the visibility and publicity of performance measurement reports increases the power of those

“ *Because Compstat does not capture essential data on legal cynicism ... the NYPD continues to pursue policing strategies, such as stop-and-frisks, that severely corrode police-community relations.* ”

reports to affect performance.⁵³ Because CompStat data is discussed at regular meetings, both managers and peers are aware of the performance of particular precinct commanders, giving the system greater behavioral power.⁵⁴ Similarly, such “external oversight is necessary to achieve sizable and lasting change in police organizations.”⁵⁵ Currently, monthly CompStat crime statistics are available on a precinct level on the NYPD website. Finally, the frequency of the measurements and the speed of the feedback can influence the ability of the performance measurement system to affect behavior.⁵⁶ CompStat data on crime and other statistics is collected in real time, and meetings happen at regular intervals.

The NYPD should leverage these strengths to ensure that CompStat has as powerful an effect on

legal cynicism as it has arguably had on crime. To do so, the NYPD should develop a broader set of performance measures to more accurately capture the effectiveness of its policing practices. These new metrics should be captured using the same computer-based system currently in use by the NYPD and regularly discussed at CompStat meetings.

THE NYPD SHOULD USE SEVERAL METRICS TO MEASURE POLICE-COMMUNITY RELATIONS

Given the difficulties encountered by the Chicago Internet Project, the NYPD should not rely on a single measure of community satisfaction to evaluate police-community relations. Because it is difficult to collect accurate survey data on community satisfaction on a consistent basis, this mix of measures includes both variables that require direct community participation and others which simply require the NYPD to draw from existing data sources. These measures include:

Complaints about police conduct. Citizens may report negative interactions with the police by filing a complaint either at the precinct or at the Civilian Complaint Review Board (CCRB), an independent New York City agency chartered to investigate complaints of police officer abuse. The NYPD should compile anonymized complaint data by precinct and incident address in order to target investigations and trainings at particular precincts. Some might argue that data from community complaints should not be included, as such information is “suspect and too subjective.”⁵⁷ However, these complaints are still “indicators of problems” even though they are not “probative of individual office misconduct.”⁵⁸

Community satisfaction surveys. The NYPD should use two different data-collection methods to collect survey data on community satisfaction. First, the NYPD should partner with a respected academic institution, such as John Jay College, to conduct a rigorous annual phone survey of a sample of New York City residents. This survey would capture the opinions of a broad sample of the population, including a mix of individuals who have and have not had previous encounters with the police. The sur-

vey would also hopefully reach lower-income populations who may not be reached by other methods.⁵⁹ These survey results would be discussed at a subsequent CompStat meeting. Because this data would be available only on an annual basis, it would allow the NYPD to make comparisons across precincts but not across time. For example, this measure may not capture changes in community satisfaction related to particular incidents of police misconduct.

In order to get a more dynamic measure of community satisfaction, the NYPD should also create a Web-based community-satisfaction survey that would feed survey results directly into CompStat in real time. The survey would be available on the NYPD website and could be filled out by any concerned community member. The NYPD could advertise the survey through public service announcements and could hand out cards with the Web address of the survey to individuals who encounter the police, whether as victims or as suspects. Community-based organizations could also refer individuals to the survey. This survey would not be statistically rigorous enough to generate generalizable findings⁶⁰ but would provide an immediate indication that some community members perceive a problem with police conduct in a particular area.

Incidence of use of force. Use of force is an important indicator of police-community relations because it can both reflect negative police perceptions of the community and cause such perceptions. As such, spikes in the number of incidents in which force is used, or differential rates of use of force across precincts, can be early warning signs of trouble. Currently, NYPD officers are required to record whether force was used in making an arrest as part of a computerized arrest report. The system that manages these arrest reports can be networked with CompStat so that it can map incidents involving use of force in real time.

By using this mix of measures, the NYPD will be able to triangulate among the different variables to get a more complete and accurate picture of police-community relations.

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Many regard Compstat as “setting the standard for police management generally, and particularly for the use of performance measurement in systems of internal accountability.”

MEASURES OF POLICE-COMMUNITY RELATIONS MAY BE EFFECTIVE AT REDUCING LEGAL CYNICISM, AMONG OTHER OUTCOMES

As little research has been done on the effect of implementing measures of police-community relations, it is difficult to estimate what, if any, effect they would have. However, the “management principle underlying CompStat is that what is counted counts in terms of organizational performance.”⁶¹ Because these new measures would be incorporated into an existing, effective performance management system, it is likely they would create several positive outcomes. In the short term, it is likely that these new metrics would:

Provide the NYPD with better information about its effectiveness. As described above, the NYPD currently does not measure all the outcomes of its policing strategies. For example, while officials can see, through CompStat, the apparent effect of stop-and-frisks on crime rates, they cannot see the strategy’s effect on legal cynicism. By providing the NYPD with more information about the effects of its strategies, the NYPD can better evaluate police

Encourage the NYPD to develop creative strategies to increase community satisfaction. CompStat meetings are both sources of accountability and “major vehicles for organizational learning,” providing the opportunity to share strategies and compare notes on what works.⁶² By making precinct captains accountable for their relationship to the community, these new metrics may encourage precinct commanders to devote more energy to cultivating positive community contacts and to develop innovative strategies to foster community-police collaboration. Successful strategies can then be shared with executives at CompStat meetings.

In the long term, it is likely that these new metrics would also:

Optimize the effectiveness of policing strategies. Commentators have argued that “the solicitation of feedback from citizens could help police ensure that the crime-reduction strategy they have chosen has not compromised perceptions of fairness and justice.”⁶³ By providing the NYPD with more complete information, the department can identify and balance the positive and negative effects of particular police strategies.

Improve police-community relationships. Research has shown that “[f]eeling that one’s voice has been heard and taken seriously is ... integral to ... police legitimacy.”⁶⁴ In addition to the effect of any proactive measures by precinct commanders, the fact that community concerns are measured and valued could improve community perceptions of police legitimacy.

Prevent crime. To the extent that legal cynicism is a cause of criminal behavior, this proposal would prevent future crimes by encouraging improvements in police-community relations.

As with any performance measurement system, the realization of these effects depends on the accuracy of the data collected, as well as the NYPD’s willingness to hold precinct commanders accountable for these measures. However, the past successes of CompStat may predict similar successes with these new measures.

In order to ensure the success of these measures, these statistics should be made publicly available on the NYPD website. Research has shown that “the more external pressure, the more rapid the pace of change” within police departments.⁶⁵ Publicizing these new measures would allow New York residents and community organizations to monitor the police and apply pressure to the mayor or the NYPD commissioner if necessary.

THE PROPOSED CHANGES MAY BE POLITICALLY AND ECONOMICALLY FEASIBLE

Recent media attention on the problem of stop-and-frisks has created an opportune moment to push for a broader set of performance measures.⁶⁶ As a result

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Compstat’s narrow focus on crime statistics and similar output measures does not comport with current best practices for police performance management. Academic literature on policing has increasingly focused on the need for police departments to build a strong relationship with the community in order to make enforcement efforts more effective; to prevent crime; and to make the community co-producers of justice.

of this media attention, as well as a high-profile lawsuit,⁶⁷ the NYPD currently faces significant external pressure from community groups to change its stop-and-frisk practices. Mayor Michael Bloomberg and NYPD Commissioner Raymond Kelly may view the addition of community-satisfaction measures to CompStat as a necessary concession given the negative media attention the NYPD has received. However, they may be hesitant to make such changes while the lawsuit against them is ongoing, fearing that the shift will be taken as an admission of guilt by opposing counsel. Similarly, the Patrolman’s Benevolent Association may have qualms about incorporating CCRB complaints and community norms into the new system but may appreciate the shift away from a results-based approach that encourages quotas.

This proposal is also likely to be supported by several key constituencies outside of city government. Community members, including the community-based organizations that represent them, may favor the proposal, as it provides them with a method to be heard and to provide consistent feedback to the NYPD. Organizations that have argued for a stronger CCRB, such as the New York Civil Liberties Union, may also support the proposal, as the new measures would require precinct command-

ers to respond to CCRB complaints on a systemic level.

Adding these new performance measures may also be economically feasible. A new performance management system may have significant up-front costs. The NYPD would have to devote significant time and resources to developing a community-satisfaction survey that accurately captures the concerns of New Yorkers. This could include several months of research and pretesting, including focus groups or community board meetings. The NYPD would then have to design a Web interface for the survey that would connect seamlessly with CompStat. Similarly, the NYPD would have to figure out how to effectively feed information regarding CCRB complaints and use of force into the system. However, once the new system is operational, it should be no more costly to maintain than the current system. The only major ongoing cost would be the annual community-satisfaction phone survey. In order to control costs, the survey could be

administered by police recruits as part of their academy obligations.⁶⁸ At the same time, if effective, a new system may have financial benefits for the city. For example, if the new system successfully improves community-police relations, it may reduce the likelihood of future lawsuits over perceived discrimination, reducing the city's litigation costs.

CONCLUSION

CompStat's use of high-tech, sophisticated computer systems masks its fundamental reliance on old-fashioned performance measures like crime and arrest rates. CompStat thus fails to capture the effect of policing strategies on police-community relations. The additional performance measures described above are intended to complement rather than replace the existing CompStat statistics. Adding police-community measures to CompStat will encourage the NYPD to internalize the otherwise invisible external costs of policing strategies on legal cynicism.

NOTES

- 1 Mark H. Moore and Anthony A. Braga, "Measuring and Improving Police Performance: The Lessons of CompStat and Its Progeny," *Policing: An International Journal of Police Strategies and Management* 26 (2003): 446.
- 2 Moore and Braga (2003) examine several local police departments that use CompStat or CompStat-like systems to monitor their performance. *Ibid.*, 449.
- 3 David S. Kirk and Andrew V. Papachristos, "Cultural Mechanisms and the Persistence of Neighborhood Violence," *American Journal of Sociology* (forthcoming 2010). Kirk and Papachristos define legal cynicism as "a cultural orientation in which the law and the agents of its enforcement, such as the police and the courts, are viewed as illegitimate, unresponsive, and ill-equipped to ensure public safety.... [W]hile individuals may believe the substance of the law, antagonism toward and mistrust of the agents of the law may propel some individuals toward violence simply because they feel they cannot rely upon the police to help them resolve grievances."
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- 5 Jennifer Trone, "The New York Police Department's Stop and Frisk Policies: Are They Effective? Fair? Appropriate? Summary of a NYC Bar Association Forum March 9, 2010," Center on Race, Crime and Justice at John Jay College of Criminal Justice, last modified June 2010, http://www.jjay.cuny.edu/forum/SQF_forum_summaryFINALJUNE28.pdf
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- 7 Walker, *Sense and Nonsense*, 285-86. Citing Tom Tyler, *Why People Obey the Law* (New Haven: Yale University Press, 1990).
- 8 Walker, *Sense and Nonsense*, 286.
- 9 Kirk and Papachristos, "Persistence of Neighborhood Violence."
- 10 Walker, *Sense and Nonsense*, 287.
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- 12 Jacinta M. Gau and Rod K. Brunson, "Procedural Justice and Order Maintenance Policing: A Study of Inner-City Young Men's Perceptions of Police Legitimacy," *Justice Quarterly* 27 (2010): 258.
- 13 David Weisburd et al., "Reforming to Preserve: COMPSTAT and Strategic Problem Solving in American Policing," *Criminology and Public Policy* 2 (July 2003): 426.
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- 15 Ibid.
- 16 Moore and Braga, “Improving Police Performance,” 447.
- 17 Smith and Bratton, “Performance Management,” 455, 462.
- 18 Ibid., 454
- 19 Ibid.
- 20 Moore and Braga, “Improving Police Performance,” 447.
- 21 Smith and Bratton, “Performance Management,” 463.
- 22 Ibid.
- 23 Graham Rayman, “The NYPD Tapes, Part 2: Bed-Stuy Street Cops Ordered: Turn This Place Into a Ghost Town,” *Village Voice*, May 11, 2010, accessed Nov. 2, 2010, <http://www.villagevoice.com/content/printVersion/1808402/>. See also Dennis Smith, Associate Professor of Public Policy, NYU Wagner, Address at NYU Wagner’s Graduate School of Public Service: Controversial Issues in Contemporary Criminal Justice: NYPD’s Stop and Frisk (Oct. 12, 2010) (describing how precinct commanders are questioned at CompStat meetings regarding, “What are you getting on your 250s?”).
- 24 Gary McCarthy, police director, Newark Police Department, former NYPD deputy commissioner of operations, Address at NYU Wagner’s Graduate School of Public Service: Controversial Issues in Contemporary Criminal Justice: NYPD’s Stop and Frisk (October 12, 2010).
- 25 Dennis Smith, Associate Professor of Public Policy, New York University Robert F. Wagner School of Public Service, Address at NYU Wagner’s Graduate School of Public Service: Controversial Issues in Contemporary Criminal Justice: NYPD’s Stop and Frisk (October 12, 2010). Whether stop-and-frisks actually reduce crime is still a matter of significant debate. See Transcript of Vera Institute of Justice, *Franklin Zimring: The Decline in Crime in New York City (1990-2010)* (Vera Voices Podcast Series, 2010), accessed Nov. 2, 2010, <http://www.vera.org/files/franklin-zimring-the-decline-in-crime-new-york-city-transcription.pdf>.
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- 36 Naima Ramos-Chapman, *Voices from Brooklyn: Racial Profiling’s Part of Everyday Life Here* (colorlines.com July 29, 2010), accessed Nov. 2, 2010, http://colorlines.com/archives/2010/08/voices_from_brooklyn_racial_profiling_part_of_everyday_life_here.html.
- 37 Geoffrey P. Alpert and Mark H. Moore, “Measuring Police Performance in the New Paradigm of Policing,” in *Community Policing: Contemporary Readings*, Geoffrey P. Alpert and Alex Piquero eds. (Prospect Heights, IL: Waveland Press, 1998), 217.
- 38 Jeremy Travis, “Measuring What Matters: Part Two: Developing Measures of What the Police Do,” National Institute of Justice (1997): 6-8.
- 39 Alpert and Moore, “Measuring Police Performance,” 217.
- 40 Moore and Braga, “Improving Police Performance,” 439.
- 41 Ibid., 444.
- 42 Ibid., 443. Moore and Braga note that “society as a whole has expectations about how the police will do their work as well as what the results of their work will be. This is particularly true when we are talking about how the police use the authority of their office: the powers to stop, to detain, to arrest, and to use force to accomplish these goals.”
- 43 Alpert and Moore, “Measuring Police Performance,” 225.
- 44 Ibid., 442.
- 45 Moore and Braga, “Improving Police Performance,” 450. See, e.g., Richland County, South Carolina, Sheriff’s Department, Richland County Community Survey,

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- 46 Moore and Braga, "Improving Police Performance," 449.
- 47 Dennis Rosenbaum et al., "Measuring Police and Community Performance Using Web-Based Surveys: Findings From the Chicago Internet Project" (Jan. 2008): v-ix, accessed Nov. 2, 2010, <http://www.ncjrs.gov/pdffiles1/nij/grants/221076.pdf>.
- 48 Ibid.
- 49 Ibid., 10.
- 50 Ibid.
- 51 Ibid., viii-ix.
- 52 Ibid., ix.
- 53 Moore and Braga, "Improving Police Performance," 443.
- 54 Ibid.
- 55 Rosenbaum et al., "Web-Based Surveys," x.
- 56 Moore and Braga, "Improving Police Performance," 443.
- 57 Alpert and Moore, "Measuring Police Performance," 222.
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- 59 Lower income populations often do not have regular access to the internet, limiting their access to Web-based surveys. They may also move frequently, preventing accurate sampling through mail surveys.
- 60 For example, the survey would not be administered to a random sample, creating a significant likelihood of selection bias. As well, there is likely to be a response bias that will skew the data toward negative perceptions of the police, as individuals who have negative encounters are more likely to take the time to locate and fill out the survey.
- 61 Smith and Bratton, "Performance Management," 462. Dean Dabney has similarly found that, in another jurisdiction that implemented a CompStat-type performance-management system, rank-and-file officers routinely expressed the perception that the system was intended to encourage them to simply arrest more people. Dean Dabney, *Observation Regarding Key Operational Realities in a CompStat Model of Policing*, 27 Justice Q. 1, 37-40 (2010).
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- 63 Gau and Brunson, "Procedural Justice," 274.
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- 65 Moore and Braga, "Improving Police Performance," 441.
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WHERE THE WATER MEETS THE ROAD: LESSONS FOR STORMWATER CAPTURE ON NEW YORK STREETS

ALEXANDER J. WOLK

ABSTRACT As extreme weather events continue to test the resilience of cities the world over, many local authorities face the challenge of adapting inadequate or outdated infrastructure in order to prevent contamination of local waterways and ensure access to clean water. Though water quality at the municipal level tends to fall under the jurisdiction of a single resource agency, such as a water utility, the extent and nature of this challenge demands a more collaborative response among agencies and stakeholders. In the United States, cities like Seattle, Chicago, and Philadelphia, through a variety of institutional arrangements, have begun to address issues such as heavy flooding and combined sewer overflows (CSOs) by employing on-site stormwater management solutions on public streets and sidewalks. Based on the policy framework and engagement strategies through which those projects were conceived, this article suggests how New York City—particularly, the New York City Department of Transportation—can be a catalyst for long-term sustainability by linking local transportation policy to the physical environment and working across agencies to implement green infrastructure in the public right-of-way while balancing the need for transit, pedestrian safety, and public space.

"A road's environmental footprint extends far beyond the edge of its pavement. In fact, nationwide the 'road-effect zone' is estimated to be 15 to 20 times as large as the actual paved right of way... Transportation infrastructure has significant direct and indirect effects on the natural environment. Roads directly affect wildlife habitat, ecosystems, and water quality through land consumption, roadkill, habitat fragmentation, and replacement of natural cover with impervious surfaces and invasive species."

—*Second Nature: Improving Transportation Without Putting Nature Second*

"What if, instead of grabbing it in pipes, rain water was slowed and stopped at the source, in private yards and parking lots and along the city's streets, and allowed to soak into the earth? What if you could recreate or mimic the natural systems that existed before development, before roofs and driveways and streets took over the land? What would that look like?"

—*Seattle's Natural Drainage Systems: A Low Impact Approach to Stormwater Management*

Much of the discussion around the connection between surface-transportation policy and environmental sustainability tends to focus on renewable energy, alternative fuels, and mass transit. While such interventions are necessary in order to reduce greenhouse-gas emissions and our carbon footprint as a nation, they generally take long periods of time to implement and are subject to the whim of state and federal authorities. Fortunately, municipal planning agencies are well-positioned to implement policies and programs that, while perhaps not on the same scale, can work in concert to help achieve more environmentally sustainable outcomes around another important issue, water quality and stormwater management. Innovative infrastructure enhancements, known as best management practices (BMPs), source controls,¹ or green infrastructure,² have redefined the role of the public right-of-way in many cities by ensuring that streets and sidewalks perform valuable ecosystem services,³ while balancing the need for transit, pedestrian safety, and public space.

Although cities like Seattle and Philadelphia have had success in retrofitting their streets, sidewalks, and other built infrastructure, other cities have lagged behind, often constrained by traditional top-down approaches and lack of government leadership. This paper will explore the role that municipal transportation agencies can play regarding on-site stormwater

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The link between automobile emissions and air quality has long been a concern among environmentalists and environmental justice advocates alike, and has been at the forefront of national debates on climate change for some time. Less publicized, though equally as important, is the link between transportation infrastructure and water quality.

management through more integrative street design and “complete streets” policies. Particular attention will be paid to the programmatic opportunities and institutional challenges around the design, implementation, and maintenance of green infrastructure. The first section will cover key issues around water quality in urban areas in the United States and New York City, followed by a brief survey of various design interventions or BMPs to address stormwater runoff. The third section will provide the regulatory and institutional context around stormwater management at the federal and state levels. Section four will include a survey of several North American cities that have successfully integrated stormwater management into broader transportation and streetscape initiatives, with discussion of feasible interventions and successful institutional arrangements. Finally, drawing from experience in other cities, the last section will look at the case of New York City and how its Department of Transportation might adopt new strategies to implement BMPs to achieve the city's clean-water objectives, as laid out in *PlaNYC 2030*, Mayor Bloomberg's 2007 sustainability plan for New York City. This will include a review of agencies involved with the design, implementation, and maintenance of green infrastructure, and describe opportunities for a collaborative working arrangement and policy framework.

TRANSPORTATION INFRASTRUCTURE AND STORMWATER MANAGEMENT

The link between automobile emissions and air quality has long been a concern among environmentalists and environmental-justice advocates alike, and has been at the forefront of national debates on climate change for some time. Less publicized, though equally important, is the link between transportation infrastructure and water quality. While clean-water issues may not receive as much media attention as greenhouse-gas emissions and climate change, this is likely to change as extreme weather events become more common. Many urban and coastal areas already face significant challenges maintaining potable water supplies and keeping waterfront areas open for public recreation.

Currently, the U.S. Environmental Protection Agency (EPA) ranks runoff from urbanized areas as the leading source of water-quality impairments to estuaries in the U.S.⁴ Because most urban land is covered by impervious surfaces (e.g., buildings, streets, and parking lots), precipitation does not infiltrate soil as it would under natural or “predevelopment” conditions. Instead, runoff from impervious surfaces containing sediment, oil, and other toxins from motor vehicles, pesticides, road salts, and heavy metals is conveyed to storm drains and, at times, nearby waterways. Throughout much of New York City (about 65 percent of the city’s sewerage area), urban runoff feeds into storm drains, which connect to a combined sewer system⁵ that eventually leads to one of the city’s 13 water pollution control plants (WPCPs) for treatment before discharge. However, while the WPCPs are designed to handle twice the level of “dry weather sanitary flows,”⁶ this extra capacity cannot always accommodate sanitary and stormwater flows during wet weather (in the case of combined sewers).⁷ In fact, a half-inch rain event can lead to a combined sewer overflow (CSO) when stormwater exceeds the capacity of the sewer system and flows are diverted through 433 outfalls that discharge directly into local rivers, estuaries, and bays. On average, there about 69 CSO events annually in New York City, 43 of which occur because of a half-inch or less rainfall event.⁸ While heavier rain events account for larger total discharges by volume, smaller CSO events have more concentrated pollutant levels because there is less diluting stormwater and because they contain the “first flush” of concentrated pollutants (particularly fecal coliform and other pathogens).⁹ Annually, the city discharges about 27 billion gallons of

wastewater (including 2 billion gallons of untreated sewage) into nearby waterways.¹⁰

While New York City has managed to improve the health of its waterways since the passage of the Clean Water Act, runoff, or what is often referred to as nonpoint source pollution,¹¹ is the leading cause of water-quality problems in the U.S.¹² Although New York’s harbor is cleaner than it has been in the past 100 years,¹³ CSOs are still a public health concern, as they are the most significant source of disease-causing pathogens in the waters surrounding the city.¹⁴

BEST MANAGEMENT PRACTICES FOR STORMWATER MANAGEMENT IN URBAN AREAS

A number of key design strategies, or BMPs, for stormwater management are recommended by the United States Department of Transportation’s Federal Highway Administration (FHWA) for “ultra urban areas.” Because densely populated cities lack adequate space to implement traditional BMPs, such as swales, rain gardens, detention ponds, etc., they must adapt the public right-of-way itself in order to control runoff. According to the FHWA’s *Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring*, the following criteria distinguish BMPs for ultra urban areas:

- “Limited space available for BMP implementation (less than 0.5 ha [1 ac])
- “Drainage area imperviousness greater than 50 percent
- “Property value of land over \$215 per square meter (\$20 per square foot)
- “Location of BMP in right-of-way (only available space)
- “Existence of build-out conditions at the site (lot-line to lot-line development).”¹⁵

The aim of ultra-urban stormwater BMPs are to collect, store, and treat the first half-inch of runoff from impervious areas.¹⁶ There are a number of structural BMPs that municipalities can employ to achieve these goals. These include:

- Infiltration technologies (bioretention): physical, chemical, and biological processes between soils and water to filter out sediments from runoff
- Filtering systems: sedimentation areas that retain the

largest particles, with chambers that filter and remove soluble constituents

- Vegetated swales and filter strips: areas that capture and filter runoff into soil, with vegetation used for biological uptake of constituents
- Water quality inlets: oil/grit separators, water-quality access holes, and catch basin inserts to remove sediments and trap debris
- Porous pavements: paved areas that allow stormwater to percolate and infiltrate the soil below.¹⁷

REGULATORY FRAMEWORK FOR STORMWATER MANAGEMENT

In 1972 the federal government passed the Clean Water Act (CWA), which aimed to “reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff.”¹⁸ The CWA puts responsibility on both the EPA and the states to identify and regulate point and nonpoint sources of pollution.¹⁹ Initially the CWA focused on regulating point source pollution such as sewage plants and industrial facilities; however, it has evolved over the years to include nonpoint runoff from streets and construction sites.²⁰

While the federal government regulates stormwater through various federal permitting programs, the actual approaches to managing runoff from local roads and highways are developed by municipalities.²¹ The federal Nonpoint Source Pollution Control Program authorizes the EPA to provide grants to states for the implementation and management of nonpoint source programs. Particularly relevant to cities like New York is the Coastal Zone Act Reauthorization Amendments, which require states to develop a coastal nonpoint pollution control program and aim to enhance state and local efforts to manage land-use activities that degrade coastal water and habitats, particularly in urban areas.

In response to federal regulations, many states have developed nonpoint-source-management programs that include guidance materials on BMPs for stormwater management, demonstration projects for BMPs under various land-use practices, and information on monitoring programs and impact assessments.²² While such programs provide guidance, urban areas like New York City are required by the state to get permits for any stormwater discharges, develop a stormwater-management program, and submit annual reports to the New York State Department of Environmental Conservation.

INTERAGENCY COOPERATION

While regulation and enforcement of water quality and stormwater management generally fall under the jurisdiction of the EPA at the federal level, states and municipalities must decide how agencies with multiple jurisdictions over a single watershed might work together. According to the FHWA's *Stormwater Best Management Practices in an Ultra-Urban Setting*, a department of transportation (DOT) “must determine the relative contribution that its activities make to the total stormwater system within the local jurisdiction and what structural components of the system will be the DOT's responsibility.” At the state level, this has translated to nearly every state DOT having a guide for the development and design of stormwater BMPs and over half of all states having developed highway runoff manuals.²³ While state level activities may be less applicable for a municipal planning agency or city DOT, there are lessons to be drawn from highway stormwater management projects, particularly in terms of interagency collaboration and actual BMPs employed. For example, some state DOTs have engaged in partnerships with federal and state resource agencies, which is a requirement under the Transportation Equity Act for the 21st Century.²⁴

SUCCESSFUL MODELS IN NORTH AMERICAN CITIES

Despite the challenges facing city agencies across the country, several North American cities are at the forefront of stormwater management, particularly in terms of integrating green infrastructure in the public right-of-way. Seattle's Street Edge Alternatives program, Chicago's Green Alley program, and Philadelphia's Green City, Clean Waters CSO Long-Term Control Plan all offer a range of lessons for cities trying to treat and absorb water onsite rather than through traditional end-of-pipe solutions.

SEATTLE: STREET EDGE ALTERNATIVES PROGRAM

In response to high levels of pollution threatening the Puget Sound's Chinook salmon, Seattle Public Utilities (SPU), which was created as a combined solid waste, water, wastewater, and drainage utility in 1996, decided to intervene by developing its Natural Drainage Systems program, consisting of a series of on-site stormwater controls, including vegetated swales, stormwater cascades, and wetland ponds, to

stop pollution upstream. Because areas around downtown Seattle were intensely developed, applying NDS in the right-of-way required smaller-scale applications and other low impact development²⁵ techniques. In SPU's Natural Drainage Systems pilot project, the Street Edge Alternatives program, the SPU staff held public meetings where they presented proposed plans for several residential blocks. Neighbors then wrote petitions in order to take part in the pilot. Once the candidate block was chosen, a series of meetings were scheduled to talk through design, parking, drainage, and maintenance issues.²⁶

While the program was highly successful from a stormwater-management perspective—achieving a 98 percent reduction for a two-year storm event²⁷ through the use of contoured swales, culverts, trees, and shrubs—it was also less costly than traditional stormwater infrastructure and provided aesthetic improvements to the streetscape. SPU staff attributes the success of the pilot to the collaborative nature of the project.²⁸ Residents (who were responsible for maintenance) were engaged early and continuously throughout the life of the project. Likewise, inter-agency coordination was key, as early resistance was felt from the Seattle Department of Transportation, whose leaders were skeptical of the program's safety, integrity, and applicability.²⁹ However, many of these concerns were addressed through the formation of an interdepartmental project team, which was active during the design and construction process. Finally, a partnership was formed with the University of Washington to monitor pre- and post-construction runoff.

CHICAGO: GREEN ALLEY PROGRAM

While cities like Seattle and Portland are renowned for their stormwater-management programs, cities outside the Pacific Northwest have also developed innovative programs to control runoff. In Chicago, under Mayor Daley's leadership, a comprehensive environmental agenda was laid out to try to make the city the greenest in America. Many city agencies responded by implementing projects that addressed issues around climate change, the urban heat-island effect, and water quality. Perhaps most notable was the City Planning and Development Department's Green Roof Initiative, which has led to the construction of more than 80 green roofs in the city.³⁰

Another important program that received wide acclaim was the Chicago Department of Trans-

portation (CDOT)'s Green Alley program, which was initially a pilot to test permeable pavement in residential alleyways in order to mitigate flooding on the city's North Side. Because the city was built on a wetland, it continually suffers from drainage problems. This results in large puddles forming along the 1,900-mile network of alleyways (the largest worldwide³¹), which are not connected to the city's sewer system. In 2006, about 40 percent of the alleys needed resurfacing but CDOT found that resurfacing made puddling worse and that it was not feasible or cost effective to connect them to the sewer system.³²

In response, the city has begun to repave alleys with permeable pavement, which reduces the rate and volume of stormwater runoff, recharges underground aquifers, and filters out pollutants and debris. The city employs four different approaches, ranging from permeable pavement with a conventional drainage system to a subsoil filtration system.³³ As of 2007, the city paid \$45 per cubic yard for permeable concrete (not including a filtration layer), compared with \$50 per cubic yard or more for conventional concrete.³⁴ Likewise, maintenance costs were kept within budget, through the use of existing street-sweeping equipment. As of 2010, more than 100 green alleys had been installed.

While the Green Alley program achieves similar goals as Seattle's Street Edge Alternatives program, it is much less collaborative. The Green Alley Handbook provides information on private BMP initiatives for homeowners, as well as dos and don'ts for adjacent property owners and information on what to expect during construction, but residents are not explicitly engaged through the program, and maintenance is handled by the city.

PHILADELPHIA: GREEN CITY, CLEAN WATERS CSO LONG-TERM CONTROL PLAN

The case of Philadelphia is also quite unique, though it bears some resemblance to Seattle's Street Edge Alternatives program in that stormwater-management efforts are spearheaded by a resource agency, the Philadelphia Water Department (PWD). For over a decade, the PWD's Office of Watershed Management (one of the few cities with such an office), has "integrate[d] their stormwater program with other

water resource protection and regulatory programs to improve synergy and develop a holistic approach.”³⁵ Such an approach, which avoids laying down additional sewer pipes and building treatment facilities, is a lower-cost strategy to help mitigate over 16 billion gallons of combined sewer overflows annually, which would cost billions of dollars using traditional approaches.³⁶

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Although stormwater will generally be under the jurisdiction of a resource agency, this does not preclude other agencies – particularly transportation agencies – from taking an active role. Indeed, it should be seen as an opportunity to achieve multiple sustainability and transportation objectives.

In addition to having strong leadership at the Office of Watershed Management, there was high-level support from various city commissioners to implement pilot programs that might traditionally be outside the realm of a utility. Likewise, the passage of a new stormwater ordinance in 2006 requiring developers to treat the first inch of stormwater on-site has necessarily integrated stormwater into the building permit process at an early stage.³⁷ The PWD also formed partnerships with other city agencies and put forth the resources to set up a development review process.

To date, the PWD has implemented a number of pilot projects in the public right-of-way, in partnership with the Philadelphia Green (the Philadelphia Horticultural Society’s city greening program) as well as Philadelphia’s Streets Department, which appears to play a more supportive role.³⁸ PWD’s plan for the city’s streets (representing 38 percent of impervious cover) includes the creation of a “green standard” for streets using a variety of approaches (i.e., planters,

swales, pervious pavement, etc.). The PWD plans to invest \$600 million over several years to “green 34 percent of the combined sewer area by managing stormwater at the source,”³⁹ which includes streets, public schools, public facilities, and open spaces. Such green retrofits would be integrated during sewer replacement, utility construction, repaving or resurfacing of city streets, and sidewalk retrofits. Most recently, the PWD received a \$30 million low-interest loan from the Pennsylvania Infrastructure Investment Authority for construction of green infrastructure projects, which will be primarily used for green streets.⁴⁰

Not surprisingly, the type of institutional arrangement as well as the design and implementation of stormwater-management projects are highly dependent on local conditions. In Seattle, a new utility was consolidated with a mandate to implement a variety of stormwater-management projects in dense neighborhoods by engaging community residents. Likewise, in Philadelphia, a new office and new leadership in the PWD (as well as an increased budget) enabled the PWD to take a more holistic approach by working across agencies to implement a comprehensive watershed-management program. And, in Chicago, CDOT’s Green Alley program was a direct response to the mayor’s directive (which bears some similarity to *PlaNYC*), though it was less an interagency effort than a CDOT-run program.

STORMWATER MANAGEMENT IN NEW YORK CITY

A commonality across the above cases is that some degree of interagency collaboration was required to achieve stated objectives. Although stormwater will generally be under the jurisdiction of a resource agency, this does not preclude other agencies, particularly transportation agencies, from taking an active role. Indeed, it should be seen as an opportunity to achieve multiple sustainability and transportation objectives.

As a member of the Interagency BMP Taskforce (created under *PlaNYC* and charged with making the reduction of CSO volumes and stormwater a priority for relevant city agencies) and more important, having jurisdiction over New York City’s streets (which make up 27 percent of the city’s land area), the NYC Department of Transportation (NYCDOT) is in a unique position to help achieve *PlaNYC*’s goal of detaining or capturing over a

billion additional gallons of stormwater.⁴¹ In fact, given that 38 percent of impervious surfaces in New York City is public right-of-way, there is unprecedented opportunity for NYCDOT to move forward on the agency's commitment to help pilot proven BMPs.⁴² Furthermore, the New York City Department of Environmental Protection (NYCDEP) estimates that incorporating source controls into road-reconstruction projects (through permeable pavement and sidewalk biofiltration) could capture 1.4 billion gallons of runoff each year by 2030, while infiltration and detention standards on sidewalks could divert over 4 billion gallons during CSO events. Combined, this would represent roughly 27 percent of CSO volumes.⁴³

Although efforts to ensure water quality typically fall under the jurisdiction of the NYCDEP, stormwater management is ultimately a responsibility that must be shared across agencies, as the previous examples highlight. It was by partnering with Philadelphia Green, which has extensive funding and support, that Philadelphia was initially able to get stormwater management in the public consciousness and eventually on the agenda of city agencies. Equally important, stormwater management was integrated into Philadelphia's zoning and building permit process.⁴⁴

While a host of agencies share jurisdiction over the right-of-way (above and below the street) in New York City, a number of initiatives to reduce impervious surfaces on buildings, streets, and sidewalks have been implemented. Among the oldest and most visible city greening initiatives is the New York City Department of Parks and Recreation's Greenstreets, which began in 1996 as a program to convert concrete traffic islands into planted areas. It has since evolved to incorporate various infiltration and detention strategies for stormwater management. The city currently has more than 2,200 Greenstreets sites and plans to add 80 more sites each year over the next decade. While the amount of stormwater capture per planted island is quite low, an extended Greenstreets program (with new designs that can accept stormwater) could make significant contributions to runoff control in certain watersheds.⁴⁵

Greenstreets presents one opportunity for NYCDOT to leverage its partnership with the Department of Parks and Recreation and NYCDEP to design a strategic network of water infiltration and detention interventions throughout the five boroughs. For example, the NYCDEP's forth-

coming online BMP mapping tool could be a platform (figuratively and literally) for interagency collaboration by layering data from other agencies in order to prioritize new green infrastructure by, for example, upcoming capital projects, routine maintenance, sidewalk capacity, underserved transit areas, or even areas of the city lacking green space. Following NYCDOT's practice of implementing pilot projects, and with the rollout of a host of new projects, numerous other models could be tested. As such, NYCDOT could adapt existing initiatives like the NYC Plaza program to require a stormwater-management component, possibly funded by a separate agency like NYCDEP, which announced a \$3 million grant program for community-based green infrastructure projects in early 2011. Such funds could be matched through the NYC Plaza program or other public funding (federal, city, or state), though alignment of grant cycles and other institutional processes and guidelines would be necessary.

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Despite the challenges facing city agencies across the country, several North American cities are at the forefront of stormwater management, particularly in terms of integrating green infrastructure in the public right-of-way.

Alternatively, NYCDOT could co-develop an entirely new program with other city agencies with overlapping goals, like the New York City Department of Small Business Services, which provides grants and training to form business improvement districts (BIDs) throughout the city. Given that BIDs often have a streetscape-improvement component, there would be ample opportunity to co-fund strategic green infrastructure projects, like bioswales or enhanced tree pits in the public right-of-way. Though there will inevitably be political and institutional questions over who administers such a grant program, specific BIDs could leverage additional agency funds for a single project that would help them meet their transit, environmental, health, and economic benchmarks.

A joint initiative of NYCDOT, NYCDEP, and the Department of Parks and Recreation—perhaps modeled after the Philadelphia model—could create a formalized program for schools and community gardens to adopt nearby green infrastructure in the public right-of-way. In the same way that Street Edge Alternatives projects function in Seattle, a school would take on responsibility to clean out debris and water plants in rain gardens. This would solve some of the key concerns involving maintenance costs.

With federal grant money (through the Partnership for Sustainable Communities, for example) there is opportunity to integrate green infrastructure into a suite of programs that NYCDOT has rolled out over the past few years, such as Safe Routes to School or Safe Routes for Seniors. While the intention of these programs is to ensure pedestrian safety (for school children and elderly residents alike) through traffic-safety improvements (i.e., sidewalk enhancements or pedestrian-refuge islands), source controls, such as swales, biofiltration systems, and catch basins, could be integrated into these infrastructure upgrades at an early phase through collaboration with the NYC Department of Design and Construction.

These are just a few of the ways that green infrastructure could be incorporated into existing NYCDOT projects. Through intradepartmental working groups and formal partnerships with NYCDEP, the Department of Parks and Recreation, the Department of Design and Construction, and other agencies (either building on the BMP Taskforce or creating a new one), planners, engineers, water experts, and ecologists can determine where efforts should be targeted, the type of technology or BMP that should be used, and how such projects may or may not link to existing sewer infrastructure. Ultimately, it will take leadership on the part of the DOT to instill these practices throughout the agency, so that green infrastructure is not only incorporated into pilot projects, but routine road and sidewalk maintenance as well.

Such interventions should not be viewed as mere add-ons or additional expenses. Not only would these measures help the city meet its broader sustainability and stormwater-management goals, but adopting them will also help NYCDOT achieve agency goals for Complete Streets.⁴⁶ For instance, one of the overall goals set forth in the New York City Street Design Manual (released by NYCDOT in 2009) is to “design for sustainability,” which includes collaborating across agencies to test new materials, mini-

mize impermeable surfaces, maximize vegetation, and reduce the heat absorption of streets.⁴⁷ Likewise, the multiple nonstormwater benefits from green infrastructure also help achieve other objectives related to creating a vibrant public realm, coherent and harmonious streetscapes, and cost-effectiveness.⁴⁸

This last point cannot be overemphasized. Cost savings realized through BMPs is significant compared with end-of-pipe treatment like water treatment facilities and can ultimately save public tax dollars. Besides agency benchmarks and mayoral mandates, in order to further incentivize an agency like NYCDOT to implement BMPs (which result in direct savings for NYCDEP), agencies should receive a credit in the form of additional capital funding or credits that are tradable with other agencies for reducing runoff. To that end, agency efforts to quantify the benefits of ecosystem services may also help create more sustainable funding streams for stormwater projects. For example, while it costs \$37 to plant a new street tree, this can result in \$61 worth of stormwater reduction.⁴⁹ Overall, the EPA estimates that source controls can offer capital cost savings of 18 percent to 80 percent.⁵⁰ Such calculations must be considered by both NYCDOT and NYCDEP, in addition to the life-cycle costs of installing green infrastructure versus conventional treatments.

While cities like Philadelphia have legally mandated a stormwater charge, by which property owners must detain the first inch of rainfall, New York City has not yet devised such a scheme (though NYCDEP now has a stormwater pilot for parking lots, requiring lot owners to pay for wastewater services). However, NYCDOT could be among the early adopters by integrating a first-inch-of-rainfall policy into all streetscape projects in order to treat the first flush. Such policies could be turned into interagency public-awareness campaigns around stormwater management and could also serve as a leverage point to engage residents in neighborhoods targeted for Safe Routes to Schools, for example, which may also be located in heavily polluted watersheds. Identifying highly visible water issues that directly pertain to the public right-of-way, much like the flooding in Chicago’s alleyways, will be key to raising this public awareness.

CONCLUSION

Implementing Seattle- or Chicago-style stormwater-management initiatives will not be without challenge. In addition to financing, there are questions to be resolved

around interagency coordination and responsibility, approvals processes, and ongoing maintenance. Even though a vegetated swale might represent a fraction of the capital cost of a new treatment facility, there are also costs to maintaining this infrastructure. Deciding whether this is the responsibility of Department of Parks and Recreation, NYCDOT, or the New York City Department of Sanitation will be a complex process, given that different BMPs require different care. But such tasks are not insurmountable. Already, new life has been breathed into the BMP Taskforce leading up to the release NYCDEP's Green Infrastructure plan in late 2010. And, perhaps even more significant, the aforementioned Green Infrastructure program grants have ushered in a new civic engagement model whereby community-based organizations can begin to take advantage of external sources and city funds to implement, design, and maintain green infrastructure. This program has important benefits for the city, including cost savings and increased awareness among residents. Such a model presents a unique opportunity for NYC-DOT to collaborate on projects in the right-of-way, both

to pursue its own complete streets agenda and to achieve the broader sustainability goals outlined in *PlaNYC*.

As urban populations continue to swell, the role of the street will become increasingly important. Runoff from impervious surfaces will only worsen if city agencies do not collaborate and begin to think holistically about designing drainage systems that are financially feasible and ecologically sound. Yet the changing nature of the street demands new organizational strategies to finance, design, and maintain projects that span multiple jurisdictions. While transportation agencies alone cannot solve a city's stormwater problems, the public right-of-way can certainly be part of the solution. Considering streets and sidewalks as a critical part of an interconnected system of mobility, safety, and ecological functions can begin to address broader environmental issues while fostering the adaptive management necessary to plan for a greener future.

NOTES

- 1 Treating surface runoff at the source rather than channeling it to a wastewater treatment facility.
- 2 Systems and practices that use or mimic natural processes to infiltrate, evapotranspire, or reuse stormwater or runoff on the site where it is generated (U.S. Environmental Protection Agency, Low Impact Development). See <http://www.epa.gov/nps/lid/>, accessed February 25, 2011.
- 3 Transformation of soil, plants, animals, air, and water into items of human value. For example, fungi, worms, and bacteria use the raw ingredients of sunlight, carbon, and nitrogen to create fertile soil. See <http://www.ecosystem-servicesproject.org/html/overview/index.htm>, accessed February 25, 2011.
- 4 U.S. Environmental Protection Agency, "Protecting Water Quality From Urban Runoff," http://www.epa.gov/owow/keep/NPS/toolbox/other/epa_nps_urban_facts.pdf, accessed February 25, 2011.
- 5 Sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. See http://cfpub.epa.gov/npdes/home.cfm?program_id=5, accessed February 25, 2011.
- 6 Wastewater flows during periods without rainfall.
- 7 The City of New York, "PlaNYC Sustainable Stormwater Management Plan: Draft for Public Comment October 1, 2008," 12, <http://www.nyc.gov/html/planyc2030/html/stormwater/stormwater.shtml>, accessed February 25, 2011.
- 8 Ibid.
- 9 Ibid, 11.
- 10 SWIM Coalition, "CSO Fact Sheet," http://swimma-blenyc.info/wp-content/uploads/2010/04/SWIM-CSO_Fact_Sheet_web.pdf, accessed April 10, 2010.
- 11 The term nonpoint source is defined to mean any source of water pollution that does not meet the legal definition of point source in section 502(14) of the Clean Water Act. Unlike pollution from industrial and sewage-treatment plants, nonpoint-source pollution comes from many diffuse sources. See <http://water.epa.gov/polwaste/nps/whatis.cfm>, accessed February 25, 2011.
- 12 U.S. Environmental Protection Agency, "Protecting Water Quality From Urban Runoff," http://www.epa.gov/npdes/pubs/nps_urban-facts_final.pdf, accessed April 10, 2010.
- 13 The City of New York, "PlaNYC Sustainable Stormwater Management Plan: Draft for Public Comment October 1, 2008," 7, <http://www.nyc.gov/html/planyc2030/html/stormwater/stormwater.shtml>, accessed February 25, 2011.
- 14 SWIM Coalition, "CSO Fact Sheet," 2, http://swimma-blenyc.info/wp-content/uploads/2010/04/SWIM-CSO_Fact_Sheet_web.pdf, accessed April 10, 2010.
- 15 U.S. Department of Transportation, Federal Highway Administration, "Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring," 3.1, <http://www.fhwa.dot.gov/environment/ultraurb/uub->

- mp3pr.htm, accessed February 25, 2011.
- 16 Ibid, 2.2.3.
 - 17 Ibid.
 - 18 U.S. Environmental Protection Agency, "Introduction to the Clean Water Act," <http://www.epa.gov/watertrain/cwa/index.htm>, accessed February 25, 2011.
 - 19 U.S. Department of Transportation, Federal Highway Administration, "Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring," 1. <http://www.fhwa.dot.gov/environment/ultraurb/uubmp1.htm>, accessed February 25, 2011.
 - 20 U.S. Environmental Protection Agency, "Introduction to the Clean Water Act," <http://www.epa.gov/watertrain/cwa/index.htm>, accessed February 25, 2011.
 - 21 U.S. Department of Transportation, Federal Highway Administration, "Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring," 1. <http://www.fhwa.dot.gov/environment/ultraurb/uubmp1.htm>, accessed February 25, 2011.
 - 22 Ibid.
 - 23 Center for Environmental Excellence by AASHTO. "Environmental Stewardship Practices, Procedures, and Policies for Highway Construction and Maintenance," 3.7. http://environment.transportation.org/environmental_issues/construct_maint_prac/compendium/manual/3_7.aspx, accessed February 25, 2011.
 - 24 Surface Transportation Policy Partnership, "Second Nature: Improving Transportation Without Putting Nature Second," 33, <http://www.transact.org/report.asp?id=206> accessed February 25, 2011.
 - 25 A stormwater-management strategy concerned with maintaining or restoring the natural hydrologic functions of a site to achieve natural resource protection objectives. Low-impact development addresses stormwater through small, cost-effective site design and landscape features that are distributed throughout the site. See www.lowimpactdevelopment.org/nhb/lid.htm, accessed February 25, 2011.
 - 26 Seattle Public Utilities, "Seattle's Natural Drainage Systems: A Low Impact Approach to Stormwater Management," 6. http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/GreenStormwaterInfrastructure/NaturalDrainageProjects/index.htm, accessed February 25, 2011.
 - 27 Water Environment Research Foundation, "Seattle Washington—Incorporating Water Quality Features Into the Right-of-Way," http://www.werf.org/livablecommunities/studies_sea_wa.htm, accessed March 10, 2010.
 - 28 Seattle Public Utilities, "Seattle's Natural Drainage Systems: A Low Impact Approach to Stormwater Management," 8, http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/GreenStormwaterInfrastructure/NaturalDrainageProjects/index.htm, accessed February 25, 2011.
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EFFICIENT SPECTRUM POLICY: D BLOCK FOR THE PUBLIC OR PROFIT?

DOUGLAS COULTER

ABSTRACT For nearly a decade, the federal government has attempted to develop a nationwide, interoperable broadband communications network for public safety agencies, such as police, firefighters, and medical first responders. The current patchwork of communication services has exacerbated the loss of life during such tragedies as the September 11 attacks and Hurricane Katrina, but little has been done to move the issue forward. A major roadblock in the progress of this issue has been the staggering cost of building such a network and the allocation of the D Block band of wireless spectrum. This article draws on the recent history of spectrum-allocation policy and the arguments from the major players in the D Block debate to conclude with the most economically viable solution to the impasse.

INTRODUCTION

For the past decade, modernizing the United States’ public safety communication infrastructure has been a priority for Congress, the public safety community, and voters. But despite such examples as the September 11 attacks and Hurricane Katrina, which illustrate how upgrading these tools could have saved lives, progress has been slow. At the same time, wireless-communication advances provide a stark contrast to the antiquated equipment used by public safety agencies, such as firefighters, police officers, medical providers, and other emergency responders.¹ Most smart-phone users can access real-time maps and upload video, while a firefighter typically can use his device only for two-way voice communication. With the recent licensing of spectrum for faster wireless broadband communication technologies—known as 4G—the U.S. has a chance to capitalize on these developments and pull public safety communications into the 21st century.

The public safety network debate now focuses on the allocation of a section of spectrum called the D Block. This spectrum band sits between the sections already dedicated to public safety and the bands purchased by wireless broadband providers like AT&T and Verizon² (see figure 1). Public safety advocates believe that Congress should allocate the D Block solely for their use in order to guarantee sufficient spectrum for communication in emergencies, with the federal government constructing a nationwide network for this purpose. Opponents of this proposal, such as the Federal Communications Commission (FCC), argue that Congress should auction the D Block for private use, with public safety priority access in emergencies (figure 1).

Because of intense lobbying by the public safety community, the issue has come up for congressional deliberation. The public safety community

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If the use of a frequency which if used industrially would contribute goods worth \$1 million could be avoided by the construction of a wire system or the purchase of reserve vehicles costing \$100,000, it is better that the frequency should not be used, however essential the project.

has successfully characterized the debate about D Block as a trade-off between the public’s safety and a temporary revenue increase for the government. These arguments often rely on the communication failures during Hurricane Katrina and September 11 to illustrate the need for a private network and imply that a government-built network is the best way to prevent more failures.

I argue that though this solution is the most likely to succeed in Congress, a federally constructed network is more likely to lead to more of these types of tragic communication failures in the future. In order to position the current situation, I will provide background on spectrum allocation, the players involved in the D Block debate, and their arguments for or against the D Block auction. I conclude that Congress should allocate the D Block based on the economic realities of the technology, capital expenses, and maintenance.

CURRENT TECHNOLOGY FAILURES

The technologies deployed by public safety have changed little in the past 30 years. In the past decade, two major disasters have illustrated the real-world consequences of

Block	A	B	C	D	E	A	B	C	C	A	D	PS	B	C	A	D	PS	B	
MHz	698	704	710	716	722	728	734	740	746	752	758	764	770	776	782	788	794	800	804
Former TV Channels	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	

Figure 1. 700MHz Band

a dysfunctional communications infrastructure. During both tragedies, the outmoded technologies used by public safety agencies reduced the efficiency of rescue efforts, causing unnecessary loss of life.

ATTACK ON THE WORLD TRADE CENTER

The lack of interoperability and the weak signal strength of the radio communication devices used by the emergency responders hampered the evacuation and rescue efforts at the World Trade Center (WTC) during the chaotic 102 minutes between the first plane's impact and the North Tower's collapse on September 11, 2001. The U.S. Congress's 9/11 Commission Report noted that the New York Police Department's (NYPD) radio systems were able to communicate on multiple channels, its chiefs could easily transmit to all officers with radios, and its equipment could broadcast great distances. The report also notes, however, that the Fire Department of New York's communication system experienced significant failures because of weak signal strength within the WTC, the sheer number of firefighters trying to use the system, and the lack of interoperability with the NYPD. This communication breakdown played a role in the failure to evacuate all rescue personnel after the collapse of the first tower.³

HURRICANE KATRINA

The congressional report on Hurricane Katrina, *A Failure of Initiative*, found that "massive communications damage and a failure to adequately plan for alternatives impaired response efforts, command and control, and situational awareness."⁴ The report details how the New Orleans Police Department and New Orleans Fire Department both lost their radio communication systems for the three days after Katrina made landfall because of flooding in the radio system's backup generators. This left much of the city's emergency responders crowding on to just one radio frequency, slowing response times and coordination efforts. The report also details how the hurricane's effect on private communication networks was devastating, knocking out hundreds of cellular towers, shutting down 911 services, and cutting the fiber-optic cable line that served as the city's primary conduit for internet and voice calls.⁵

SPECTRUM AND AUCTIONS

RECENT SPECTRUM HISTORY

Radio spectrum is a highly prized and scarce resource. Since the early 20th century, the federal government has controlled allocation of spectrum through the FCC. Until the 1980s, the FCC primarily allocated spectrum through a series of closed-door hearings sometimes referred to as "beauty contests," where regulators picked the most attractive use.⁶ This was followed by lotteries, which in theory would level the playing field for potential users through random selection from a pool of applicants. This system, however, proved problematic because the FCC did not account for the capabilities or qualities of the applicants.

Long before both of these failed methods were used, Ronald Coase proposed in his famous 1959 article "The Federal Communications Commission" that auctions were the best way to allocate spectrum. Regulators suggested that spectrum was too scarce, and therefore the market could not allocate its use correctly. Coase however noted that "land, labor, and capital are all scarce, but this, of itself, does not call for government regulation."⁷ His notion, radical for the time, was that all spectrum be auctioned to whomever could afford the licenses.⁸

Coase also contended against allocation of spectrum to public use for free. He argues,

If the use of a frequency which if used industrially would contribute goods worth \$1 million could be avoided by the construction of a wire system or the purchase of reserve vehicles costing \$100,000, it is better that the frequency should not be used, however essential the project.⁹

His argument is that if it is not worth it to the government to pay for the licenses for its own uses, then it should go to the market, where someone with a higher willingness to pay will acquire the rights and thus increase societal utility.

Despite economic-efficiency arguments for auctioning spectrum and, surprisingly, the potential for a new revenue source, Congress and the FCC ignored Coase's recommendations. It was not until the Omnibus Budget Reconciliation Act of 1993 that Congress gave the FCC the author-

ity to auction spectrum. This allocation process, coupled with the shrinking of cellular devices, led to explosive growth in mobile usage. According to CTIA-The Wireless Association, in December 1995, there were 33.8 million cellular subscribers and as of December 2009, there were 285.6 million—effectively 91 percent of the U.S. population.¹⁰ This rapid growth led to increased demand for spectrum.

THE 700 MHZ SPECTRUM AUCTION

In the late 1990s, Congress and the FCC wanted to provide more broadband spectrum for commercial purposes. To wit, the Balanced Budget Act of 1997 stipulated that the FCC should reclaim the 700 MHz band from television providers and auction it in 2005, though the auction was ultimately delayed until 2009. The law stipulated that within this band, 24 MHz must be set aside exclusively for public safety use for broadband data access. The FCC broke the 700 MHz band into six blocks (A through E Blocks, plus a public safety block) with hundreds of sublicenses within those blocks. A bidder could win any combination and number of the licenses offered by the FCC. A reserve price, or minimum required bid, was set for each license. According to estimates, the auction brought up to \$15 billion in profit for the federal government.¹¹

The 700 MHz auction—FCC’s Auction 73—began on January 24, 2008, and generated over \$18.957 billion after 38 days of bidding, well over estimates.¹² Dozens of companies engaged in the process, but two companies clearly emerged as the leaders. Wireless Strategy, a wireless consulting company, found that AT&T spent \$6.637 billion and won 227 auctions within the B Block, covering 62 percent of the U.S. population.¹³ Verizon spent \$9.363 billion and won 109 auctions: 7 C Block auctions, which included enough spectra to cover wireless use by 98 percent of the U.S. population; 25 A Blocks, which could cover 52 percent; and 77 B Blocks, which could cover 16 percent.

The FCC, however, did not successfully auction the D Block. Many restrictions were placed on this band, including one that would allow the winner to only use a fraction of the spectrum for their own purposes. Just one company bid for the block but set its bid for \$472 million, signifi-

cantly lower than the FCC’s reserve price of \$1.33 billion.¹⁴ Former FCC commissioner Jonathan Adelstein suggested the financial burdens were too significant in the auction, saying, “We clearly misjudged the interest [in the D Block] and set rules that apparently inhibited the financing [for bidders].”¹⁵ With no D Block winner, the FCC left the issue of the public safety network to be decided later.

D BLOCK

THE FCC’S PUBLIC SAFETY PLAN

Congress directed the FCC to release the National Broadband Plan (NBP) in the spring of 2009.¹⁶ The NBP specifically recommends the construction of a public safety broadband network. As the head of the FCC’s Public Safety and Homeland Security Bureau, Rear Admiral James Barnett, said, “We have a brief technological window to get everybody on the same page from the beginning and build a 21st Century ... broadband system.”¹⁷

The FCC outlines a public safety network composed of four levels. The core of the network would be the wireless network deployed exclusively for public safety’s use. Additionally, users could rely on the commercial wireless networks for priority roaming; then there would be micro-cells and distributed antenna systems and—in situations where all towers were rendered inoperable—deployable equipment such as satellite phones. By giving public safety priority access on other networks, this plan would provide a significant amount of redundancy to the public safety system. The emergence of new wireless technologies now gives carriers a more robust ability to allow for prioritization of calls. In an emergency, for instance, connecting a call for a firefighter or police officer would have first priority.

The most controversial element of the NBP’s public safety recommendations is “licensing the D Block for commercial use, with options for public safety partnership.”¹⁸ Unlike the previous auction, this new auction would attach fewer restrictions and allow the winner to use the full band. The purchase of the D Block, though, would come with stipulations that all devices function in both the D Block and public safety blocks.

By ensuring that the communication technologies are similar for commercial and public safety uses, the NBP recommendation will allow public safety to benefit from the economies of scale associated with a large customer base. Without this interoperability with the commercial networks, public safety agencies could be forced to purchase equipment that function only in its frequency. For such specialized and limited users, the costs could be quite high. Since agencies will periodically need to change or upgrade their equipment, this lack of economies of scale would pose a continuously high expense for decades to come. Moreover, by tying public safety's devices to the continually improving commercial networks, there would be technological advances that continue to enhance the spectral efficiency of the communication networks, as well as improvements in interference prevention.¹⁹

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We clearly misjudged the interest [in the D Block] and set rules that apparently inhibited the financing [for bidders].

The FCC's Omnibus Broadband Initiative (OBI), a cost analysis of the public safety network plan in the NBP, estimates that the federal government would need to spend \$6.5 billion over 10 years to develop a public safety network with public-private partnerships.²⁰ The bulk of this estimated expense would be \$4 billion to add public safety hardware onto 41,600 commercial towers and \$1.5 billion to upgrade the security and backup energy for commercial towers. After these initial expenditures, the OBI estimates approximately \$1.3 billion per year will be necessary for ongoing costs, which it suggests could be collected from a broadband tax.

An independent network deployed by the states and federal government, however, has much higher estimated costs. The FCC estimates it

would cost approximately \$15.7 billion in capital expenditures, the rise due to the cost of building completely new cell towers and complications with acquiring land to build the towers. The net present value of the capital expenditures and 10 years of operation of a stand-alone network would be anywhere from \$34 billion to \$47 billion.

PUBLIC SAFETY'S OPPOSITION

The organizations representing public safety have fiercely argued against the proposed D Block auction. The National Public-Safety Telecommunications Council established the 700 MHz Broadband Task Force in 2008 in order to determine the requirements for a nationwide, public safety broadband system. They indicated in their report that allocating the D Block to public safety was essential during a disaster: relying only on the 10 MHz allocated exclusively to public safety would not be enough,²¹ despite the fact that the FCC has pointed out that spectrum does not equate with capacity.²²

In February 2010, New York City released a substantial report furthering the argument for the public allocation of D Block.²³ They argue that beyond the fact that 10 MHz will not provide enough capacity, it also makes technical sense to pair the D Block and public safety bands because they are parallel. The city agencies maintain that this pairing will reduce the cost of equipment as auctioning the D Block will split the public safety bands, requiring separate wireless networks for voice and data transmissions.

Public safety officials also claim that commercial networks are simply not reliable enough. Whatever knocks the public safety network offline would probably also knock out the commercial networks, as happened during Hurricane Katrina. Even if the networks are not knocked offline, customers tend to rush to use their devices during an emergency, bringing down local networks. This was the case on September 11, when most of the local telephone infrastructure was inoperable. Consequently, the NYPD and the Association of Public-Safety Communications Officials International both explain that during these critical incidents, emergency responders cannot even rely on the commercial networks as a backup. This logic highlights, though, that even if public safety had the D Block, there would be no effect on the stability of the physical infrastructure of cell towers. More spec-

tra would do little to ensure the physical strength of the towers during a disaster.

The D Block is also a relatively small section of the spectrum. The New York City white paper specifically addressed the National Telecommunications and Information Administration's suggestion that 700 MHz more spectrum will need to be opened to support increases in mobile broadband demand. Since the publication of the paper, the Obama administration announced its plans to reallocate 500 MHz to auction for mobile broadband.²⁴ This 500 MHz will come from federal use as well as from potential agreements with television broadcasters to sublicense their spectrum. The D Block represents 10 MHz—or only 2 percent—of the total amount of broadband that the federal government will open up for commercial use. They contend that with so many spectra opening up in the future, why does the government not simply look elsewhere for profit-generating spectra?

Politically, public safety officials frame the proposal to auction the D Block as the federal government favoring short-term economic benefits over the long-term public good. This is a compelling argument, suggesting that the FCC and the federal government are more interested in money than firefighters. Another public safety advocacy group, the Public Safety Alliance, used similar language when they launched a \$500,000 advertising campaign and lobbying effort to oppose the D Block auction in the summer of 2010.²⁵ These lobbying efforts focused congressional attention to this issue and began developing momentum for public safety taking over the D Block.

CONGRESS

Members of Congress also want a public safety network but are somewhat divided on the D Block question. The debate in the House is similar to the argument between public safety agencies and the FCC: either auction the D Block for private use or give it exclusively to public safety. Interestingly, there does not appear to be any partisan split on this issue: the D Block auction has strong opposition from both Democrats and Republicans.

Those against the auction currently include Joe Lieberman (I-CT) and Senator John McCain (R-AZ). Both of these senators are sponsors of the First Responders Protection Act of 2010, which would give the D

Block to public safety.²⁶ The bill would raise initial funds for building the network by auctioning a different piece of spectrum for \$5.5 billion and would raise an additional \$5.5 billion for ongoing costs through another auction. This funding, however, is less than the FCC cost estimates for building a public safety network with a commercial partner and significantly less than a government-built network.

Opposed to the auction in the House are Representative Peter King (R-NY) and Representative Anthony Weiner (D-NY). King is the primary sponsor of the Broadband for First Responders Act, which would amend the previous legislation to use the D Block to increase public safety's spectrum allocation. A look at the co-sponsors of the bill shows the bipartisan nature of the issue, with 43 Democrats and 26 Republicans supporting the legislation.²⁷

On the other hand, the House Committee on Energy and Commerce is considering a bill supporting the auction of the D Block. Representative Henry Waxman (D-CA) and Representative Rick Boucher (D-VA) are working on the draft of the public safety Broadband Act of 2010, which would enact many of the FCC recommendations. The legislation directs the FCC to increase the flexibility of its rules surrounding public safety communication to allow for sharing of bands with commercial providers.²⁸ In this plan, funding for the public safety network would come primarily from the auction of the D Block.

MOBILE PROVIDERS

Further aligned against a D Block auction are the winners of the 700 MHz auction: AT&T and Verizon.²⁹ Both companies have made a significant investment in the 700 MHz band and appear interested in preventing further entrants into the market. Limiting access to this lucrative band will help limit competitors and potentially allow them to keep prices up on their 4G wireless services. Hardware manufacturers are also opposed to the potential auction. Motorola, the major provider of most public safety equipment, resists the auction, likely because the requirement of device interoperability across the entire 700 MHz band would draw new competition into the market.³⁰ On the other hand, wireless providers that were shut out of the 700 MHz auction support an auction. Sprint Nextel and T-Mobile welcome the auction because it

would give them an opportunity to acquire some of the best spectrum available.³¹ In fact, speculation is that the FCC will set up the auction rules to either explicitly block AT&T and Verizon from bidding or set a technical restriction that prevents any user with more than a certain amount of the 700 MHz spectrum from bidding.³²

Therefore, it is not surprising that *BusinessWeek* notes that the Public Safety Alliance is indirectly sponsored by two of the largest winners of the 700 MHz auction, AT&T and Verizon, as well as two of the largest public safety equipment manufacturers, Motorola and Alcatel-Lucent.³³ Though this is not an unusual practice, it is important to differentiate between valid public safety concerns and what are perhaps inflated concerns to protect business interests. The funding that public safety advocacy organizations receive from large corporations, which would benefit greatly from the public use of the D Block, undermine their argument that the federal government is more interested in short-term economics than long-term safety.

THE WHITE HOUSE

Throughout 2010, the Obama administration supported the FCC's arguments about the D Block auction but had not endorsed any plan for fear of upsetting public safety interests. However, the White House reversed positions in the beginning of 2011 and began to push Congress to allocate the D Block exclusively to public safety.³⁴ This was likely a political response to the approaching 10th anniversary of the September 11 attacks.

RECOMMENDATIONS AND DISCUSSION

As I have detailed in this paper, any decision about the D Block is complicated. There appear, however, to be two clear options under consideration:

Auction the D Block to a private company, with the federal and state governments supplementing building costs for a public safety network with this commercial partner.

Allocate the D Block to public safety, with the federal and state governments absorbing all costs to build a public safety network.

In the following section, I recommend the first option—auctioning the D Block to a commercial carrier—based on the economic realities of the technology, capital expenses, and maintenance involved in establishing a safety-communications network. These significant costs support the plan to auction the spectrum to a commercial carrier with whom public safety agencies would collaborate to build a network. However, because of the current political climate, the FCC may ultimately be unable to achieve this.

TECHNOLOGY

The arguments for auctioning the D Block based on technological needs are ultimately stronger than the opposition's. All players in the D Block debate support building a new, interoperable broadband network for public safety. From an efficient-spectrum-usage standpoint, though, public safety has nominal day-to-day usage, with intermittent spikes during emergencies. As the FCC argues, it would be inefficient for public safety to be allotted vast amounts of spectrum that would most of the time go unused. As examples like Hurricane Katrina and September 11 show, however, it is critically important that public safety has the capacity to handle these emergency situations. While not tested on a large-scale yet, priority roaming of public safety agencies onto commercial networks should provide a vastly larger amount of potential capacity for the operation of their devices during emergencies.

Another important consideration is the power of market forces in driving technological innovation. As the advances in mobile technology have illustrated over the past decade, the consumer demand for newer and faster devices drives technological improvement. Public safety has generally not been a part of these advances because its networks were technologically isolated from commercial networks. By connecting the technological evolution of the public safety network to the advancement of commercial networks, it is likely that data compression will improve and speeds will increase, allowing for more-efficient spectrum use for all users.

Finally, an auction would provide needed competition in the 700 MHz band. AT&T and Verizon dominate this band and have little incentive to lower prices. While wireless carriers will face com-

petition from wire-line internet providers such as cable companies, the future of broadband is in wireless connections. By allowing more firms into this space, the government is ensuring a competitive and robust wireless broadband future.

CAPITAL EXPENDITURES

Auctioning the D Block, building out a nationwide broadband network, and the long-term ramifications of a public-private partnership are overwhelmingly strong arguments for the FCC's plan to auction the D Block and develop a close collaboration with a commercial partner. While some argue this is a crass justification at the expense of the public good, the economics of building and maintaining this network work out such that a public-private partnership is the most feasible way of building a network that can be effectively maintained over the long run. First, with estimates of over \$3 billion, the auction will generate significant revenue for the federal government to build the network.³⁵

Considering current economic conditions, a partnership between a private company and the public safety network entity, as proposed by the FCC, will be the most feasible solution for covering construction costs. Allowing public safety to rely on its commercial partner to cover initial construction outlays, with federal and state governments covering only the additional costs associated with increasing public safety's standards, is the most realistic scheme of covering these capital expenditures.

MAINTENANCE

A partnership presents an opportunity to not only lower initial costs but also decrease ongoing costs. As a commercial network faces pressure from consumers to continue to maintain its infrastructure, maintenance will be prioritized more quickly than if it were the sole responsibility of the government. As public safety is not a paying customer with the ability to switch providers, a network built and run by the government will never face the same demands for upgrades as a commercial network. A completely public network would face almost none of the economic pressures of a commercial broadband network and would be dependent on the fickle nature of government funding. Considering that during economic downturns, police

and firefighters frequently face cuts in staff and resources, a broadband network will most likely never receive adequate financial support.

While this may not always be the case, the United States appears increasingly unable to maintain its infrastructure, from roads to levees to water pipes. The American Society of Civil Engineers released a report in 2009 estimating that the federal government needed to spend upwards of \$2.2 trillion to bring the country's infrastructure up to date.³⁶ Considering the U.S.'s inability to fund the maintenance of essential services like water and sewage, it appears increasingly likely that the same fate would befall a national wireless network.

These concerns should caution anyone suggesting a fully government run network. Relying on federal money for network construction could potentially be more detrimental than relying on a private company. For instance, the initial build-out will require significant spending, as much as the \$40 billion estimated by the FCC. Considering the conservative turn in the 2010 midterm elections, it is unlikely that Congress will be able to secure this additional spending.

POLITICS OF THE AUCTION

Politically, public safety has a significantly stronger argument for not auctioning the D Block. Framing the issue as one of profit over people works on a number of levels. For instance, the suggestion of helping the public good at the expense of wireless carriers will appeal to many liberal and Democratic politicians. On the conservative side, politicians can also easily recall the heroism of emergency responders during September 11 and imply that supporting the allocation of the D Block to public safety is the equivalent of supporting those heroes. By stating the issue as a choice between helping first responders or putting them in jeopardy, supporters of allocation for public safety currently have the upper hand and momentum behind their plans.

This is not to say that there is no other way to frame this issue and potentially realign political consensus on the FCC's recommendations. As discussed earlier, the economic situation provides a strong basis for the auction. Arguing that this

plan is the most fiscally sound option may increase support. In many ways, a public-private partnership is a more conservative, smaller-government approach to achieving the public safety network. Suggesting that the public safety network is an unnecessary waste of taxpayers' money as well as a burdensome cost that will prevent reduction of the federal deficit could garner support for the FCC's plan. However, the fiscal responsibility argument may not have more traction than the patriotism-inducing arguments of helping those who helped us on September 11 with conservatives, but it is a potential strategy to combat public safety's argument.

CONCLUSION

The best course of action for Congress and the Obama administration is to support the auction of the D Block for commercial use and create a public-private partnership with the winner. Auctioning the D Block will generate revenue that will go directly to building the public safety network. The winner of the auction will be required to build a network that will function as the infrastructure of the public safety network. Twenty-four megahertz will be solely for the use of public safety and, in extreme situations, public safety may roam onto the commercial networks on the D Block.

Public safety makes a valid argument about its capacity needs in the future. In fact, the allocation of a wide swathe of spectrum for public safety to allow for growth and expansion is convincing. The reality, though, is that current economic uncertainty and the inability of the U.S. to address critical issues of infrastructure maintenance and upgrades suggest that the federal government is not in a position to do this.

Should the FCC auction off the D Block, it is possible that, decades from now, public safety will require more capacity. This is a real risk and a valid concern for public safety organizations. But it is also just as likely that 40 years from now, a government-run network will be exactly the same as the day it was built, or perhaps even in a state of disrepair because of Congress's inability to fund upkeep. Further, the technologies used in a hypothetical public safety network with no commercial partner will likely advance very slowly. Without the benefits of the technological improvements that public safety will receive from a commercial network, officials might eventually be left with outdated equipment and network technology. Without a commercial partner, public safety could find its communication infrastructure in the same outdated condition it is in now.

GLOSSARY

4G: Refers to "Fourth Generation" wireless technology. Starting with the original analog networks—1G—in the 1980's meant solely for voice use to the newest technology, 4G will allow data transmissions up to 40-50 Mbit/s and significantly faster speeds in the next decade.³⁷

700 MHz Band: The section of spectrum freed up after the transition to digital television. The 700 MHz band is considered the "sweet spot" of spectrum because of its potential for faster speeds and better penetration through walls and buildings.³⁸

Bands/blocks: Spectrum is divided by regulatory agencies according to bands or blocks. These chunks are then subdivided into further channels,

allowing for narrower transmissions. Common uses of the spectrum include FM radio stations (88-108 MHz) and television stations (such as 54 to 88 megahertz for channels 2 through 6, 174 to 220 megahertz for channels 7 through 13).³⁹

D Block: An FCC-designated 10 MHz band of spectrum located within the 700 MHz band from 758-763 and 788-793 MHz.⁴⁰

Spectrum: The electromagnetic spectrum includes everything from x-rays to light. Radio spectrum—or simply spectrum in this paper—refers the electromagnetic radio frequencies that can wirelessly carry data such as text, audio, and video that occurs between 3 KHz to 3700 MHz.⁴¹

NOTES

- 1 One of the leading representatives of the public safety community is the National Public-Safety Telecommunications Council, an advocacy organization that represents a number of member organizations such as the American Association of State Highway Transportation Officials, the International Association of Chiefs of Police, and the International Association of Fire Chiefs. "Who We Are," Public Safety Alliance, retrieved August 28, 2010, <http://www.psafirst.org/who-we-are>.
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THE NUTS AND BOLTS OF BUILDING DEMOCRACY IN EGYPT

BRIANNE LUTE

ABSTRACT Significant political questions remain unanswered in Egypt. However, at this fateful moment it is vital to ask not just whether there will be democracy in Egypt, but how. The natural tendency is to focus on “free and fair elections” without paying adequate attention to the institutions and processes that must be established to ensure the long-term success of a transition to democracy. In addition to an immediate constitutional-reform process, four key elements must be established in order for a functioning democracy to take root: civil society, institutions of democratic governance, political parties, and a free and fair electoral process.

The Egyptian army has shunted Hosni Mubarak aside. Now what? Pundits, politicians, professors, and people around the world are all debating the prospects for democracy in Egypt. What role will the army play? What does the Muslim Brotherhood want? Can it function as just another party in a multiparty system? What policy will the United States follow? These political questions are certainly important, but at this fateful moment it is also vital to ask not just whether there will be democracy in Egypt, but how. The natural tendency at moments such as this is to focus on “free and fair elections” without paying adequate attention to the institutions and processes that must be established to ensure the long-term success of a transition to democracy. What exactly are the practical steps that must be taken to establish the systems and institutions necessary for sustainable democratic governance?

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But, while the Egyptians know that they want greater freedom, they have little practical experience in exercising it.

In Egypt, the challenge is daunting. After the assassination of former president Anwar Sadat, Mubarak established a legal state of emergency. He concentrated powers in the president’s office, ostensibly in order to crack down on Islamic extremism, but Mubarak actually used those powers to destroy all independent political life in Egypt. The heavy hand of his regime extended throughout society. For three decades it stifled political development and innovation, and suppressed human rights. To make matters worse, Mubarak’s 30-year state of emergency was preceded by nearly 30 years of dictatorial rule by Gamal Abd al-Nasser and Anwar Sadat. Over half of Egypt’s population is under the age of 24. These young people and their parents have never known anything but an oppressive, single-party state. The news coverage from Tahrir Square eloquently demonstrates that many Egyptians long for reform. But while the Egyptians know that

they want greater freedom, they have little practical experience in exercising it.

A healthy political transition depends not just on the demand for freedom but on the supply of processes, systems, and services that will allow the people to express their will. It is public institutions that translate that popular enthusiasm for change into a sustainable democracy. In addition to an immediate constitutional-reform process involving all of the country’s stakeholders, four key elements must be established in order for a functioning democracy to take root: civil society, institutions of democratic governance, political parties, and a free and fair electoral process.

CIVIL SOCIETY: CAPACITY DEVELOPMENT, ACCOUNTABILITY, AND ACCESS

Without a free civil society, the revolution risks losing momentum and could perhaps result in a collective feeling of disenchantment with democracy itself. To truly effect change, citizens must organize and work independently toward finding solutions to the problems facing the country. The transition from a large mass of protesters to a network of organized civil-society organizations (CSOs) will not be an easy one. In addition to creating a legal framework that truly allows CSOs to function openly, these groups must develop their own capacity to implement organized agendas and provide services to the citizenry—such as, for instance, voter education, issue advocacy, and election monitoring. Implementing these programs requires the skills and, importantly, the resources that will permit these groups to recruit, motivate, and teach citizens how to engage in a democratic process. First and foremost, it requires leadership.

Past experience from democratic transitions teaches us that most newly formed CSOs will be very loosely organized and will need a significant amount of external assistance in the initial stages of their development. Ideally, international organizations and the more advanced Egyptian CSOs (to the extent that their existence had been permitted) will help these fledgling groups get on their feet. Because CSOs are the sinew of a healthy democratic system, connecting people and the government, it is very important that CSOs be separate and independent from the political parties. They must occupy a dis-

tinct space that will allow them to build credibility with the people and politicians alike. At first, however, their role will not be well understood by either group, and much of their time will be spent educating politicians whose attitudes toward CSOs typically swing back and forth between two unhealthy impulses. On the one hand, the politicians will fear that the CSOs are trying to supplant them. On the other hand, they will see them as potential power bases and seek to turn them into pliant vehicles for personal aggrandizement. Therefore, external actors seeking to foster the growth of CSOs must avoid the tendency to cut corners by simply empowering dynamic personalities who talk a good game. The focus should be on helping to build organizations dedicated to serving a broad constituency.

Any government, no matter how democratic, will not fully represent the will of the people unless it is held accountable. Therefore, the heart of the CSOs' mission is to safeguard the public's access to information about the government's policies, budget, and delivery of services. With that in mind, CSOs would be wise to advocate for a freedom of information law.

MONTENEGRO: PARLIAMENTARY MONITORING

Fortunately for Egyptians, waves of democratization around the world have produced a wealth of experience from which they will be able to draw valuable lessons. For instance, in Montenegro—which peacefully declared independence from Serbia in 2006—local CSOs play a critical role in moving the country toward sustainable democratic practice by monitoring and assessing the work of parliament. Civil-society organizations such as the Montenegrin Center for Democratic Transition and the Network for Affirmation of the NGO Sector assiduously follow parliamentary proceedings and, using a variety of practical tools, hold elected officials to account while also informing the public of the parliament's work. For their part, politicians often feel threatened by the CSOs' influence at home and abroad, and their ready access to the media. Politicians frequently accuse these organizations of trying to form their own political parties. However, these CSOs have learned how to take the heat and continue to apply pressure to the political system. The value of their work in generating greater transparency and accountability in Montenegro cannot be exaggerated.

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A healthy political transition depends not just on demand for freedom but on the supply of processes, systems, and services that will allow the people to express their will.

DEMOCRATIC GOVERNANCE: REPRESENTATION, OVERSIGHT, LAWMAKING, IMPLEMENTATION

Historically, Egypt's parliament has been nothing but a rubber stamp for the regime. Members of parliament have failed to fulfill even the most basic roles of a legislative body: to represent citizens, conduct oversight of the executive (including budgets and appropriations), and make laws. This body will have to shift dramatically from being an agent of the president's will to being a true representative of the people. This change will require the creation of a new institutional culture, a task that begins with changing the mindset of members of parliament. Of course, the desire of the Egyptian people themselves for change will provide the greatest impetus for this reform in parliamentary culture. Additionally, foreign states, organizations, and experts with experience in democratic systems can play a particularly helpful role, not least because they constitute a repository of experience from which the Egyptians can draw.

The task requires assistance on many levels: educating members on true parliamentary procedure, developing legal reforms to create a foundation for true democracy, and simply training staff and providing the resources necessary to conduct oversight of the executive. Some key areas for development include rules of procedure; executive-legislative relations; committee structure and function; constituency relations and public outreach; staffing, ethics rules, and financial disclosure reporting; and legislative development, research, and analysis. Members of parliament who have been schooled in the backroom methods of dictatorship must be made aware of the importance

of publicly legitimizing their activities. If they fail to demonstrate their understanding of the people's needs, they will at best find themselves voted out of office at the first opportunity. At worst, they will undermine the legitimacy of a fragile new system. Therefore, after elections are held, the education of new members is crucial. As in every country, including advanced democracies, newly elected members are often ignorant of the way the institution functions and their individual role in it.

Egyptians in favor of democracy can hope that, once leadership emerges, the candidates for parliament will recognize the changing tide and join in democratization efforts. One key way the new parliament, when it is seated, can strengthen the institution is by

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However, it will take time for Egyptians to trust a new political party system in the country. In a society where people have been brutalized for simply expressing a political opinion, fear does not fade quickly.

passing a law to designate parliamentary staff as civil servants. Civil servants are nonpartisan employees who provide assistance to the institution of parliament and its members, and serve as the institutional memory for a body, which through the various election cycles, will see parliamentarians come and go. Further, establishing a civil service helps ensure that all parliamentarians have access to the same resources to carry out their work.

In addition to building the capacity of parliament's members and staff, the Egyptians should also create a strategic plan for the parliament. Many parliaments and national legislatures around the world have seized the moment of transition and established modernization committees to organize their work, to take ownership over the inevitable influx of foreign funds and technical parliamentary assistance, and to plan for the

future. One of the greatest acts of practical assistance that established democracies could provide the Egyptians at this stage would be to identify potential leaders and stakeholders, bring them together as a group, and impress upon them the value of developing a coherent institutional plan. Likewise, countries that traditionally provide development funds to Egypt, together with the relevant international organizations, should quickly agree upon a unified approach to providing assistance. Without such a plan, it is likely that the competing interests of the countries and organizations offering assistance will result in the duplication of efforts and mass confusion on the ground, rather than providing valuable resources for the local movement.

LIBERIA: LEGISLATIVE MODERNIZATION PLAN

In 2009, after years of violent conflict, Liberia's national legislature adopted a five-year legislative modernization plan. It details the institution's priorities, identifies its sources of assistance, and determines how resources will be allocated. The plan identifies key goals and develops processes to provide, among other things, tools and techniques to help individual legislators fulfill their roles, training for legislative staff, and improvements to the legislature's infrastructure. The Liberian legislature also adopted a Freedom of Information Act and established a legislative budget office which allows it to more successfully fulfill its all-important oversight role.¹ Understanding and analyzing how the executive budgets and spends the country's money bestows tremendous power on the legislature and serves as an important check on the executive. A democratic parliament in Egypt would be wise to implement similar plans.

Parliament, however, is by no means the only institution that will require assistance. The offices of the president, vice president, prime minister, and ministries will be equally needy. The parliament can function in perfect democratic fashion, producing laws that ensure the rights of the Egyptian people, but as long as the executive branch is unable to implement the legislation, it will have absolutely no impact on people's lives. These offices will inevitably experience great upheaval in the coming months. They will be in desperate need, in general, of structures, processes, and policies that will allow the executive branch to identify the needs of the people, fix priorities, and implement the laws

passed by parliament. More specifically, executive branch offices will need assistance developing strategic plans, determining a division of labor, conducting communications, and simply formulating day-to-day policy in the new, pluralistic environment.

It is often the case in democratic transitions that the legislature receives the lion's share of attention, because it is the "people's body." In addition, executive office assistance programs are often politically unpopular, because they are easily depicted as politically biased—as efforts to prop up a particular leader or political party. Indeed, they are often perceived as an illegitimate intrusion by international actors into domestic politics. However, if implemented appropriately, these programs can avoid hot-button domestic issues and instead focus on the creation of a democratic executive office.

The executive branch is the avenue through which the tangible benefits of democracy are actually delivered. If laws are not implemented appropriately, citizens see the clamor of democracy but they still lack the goods and services that they expect most from government: security, clean water, economic opportunity, education, etc. As a result, they will turn their back on the entire system. Sentences that begin with "Mubarak had his faults, but at least he gave us ..." will be a common phrase on everyone's lips.

POLITICAL PARTIES: LINKING GROUPS TO GOVERNMENT, ORGANIZING DIFFERENCES, AND CREATING COMPETITION

For almost 60 years, people in Egypt have been deprived of the opportunity to gather formally with like-minded Egyptians to discuss their aspirations, ideas, hopes, and plans for their country. In democracies, political parties provide an important link between citizens and their government. When functioning at a high level, parties can influence how people's needs are addressed and advocate on behalf of their membership. A necessary reform, therefore, is a political party law that grants Egyptians the legal right to form and act on behalf of political parties of their choosing.

Political parties can facilitate greater understanding and compromise in society. Every country has a vari-

ety of groups with competing interests and needs, and Egypt is no different. Each nonviolent group should be given an opportunity to participate in the democratic process and have their voices heard—whether it's Coptic Christians, liberal or conservative Muslims, the educated or the illiterate, the elite or the average Egyptian, the young or the elderly, farmers or urbanites. Gathering ideas directly from the people expands the range of possible solutions for the problems facing the country and helps ensure that the government will tailor policies in a way that will benefit the largest number of people.

Furthermore, a competitive, multiparty system provides a constructive avenue for public policy debates and introduces accountability into the political system. Citizens can choose the party that most closely aligns with their values, ideas, needs, and expectations. If the party does not fulfill its role, a member has the option to switch affiliation. This freedom of movement pressures parties to live up to their campaign promises and deliver the best possible outcomes for constituents.

In addition to their rights being enshrined in the law, nascent political parties have several other pressing needs. They must build their internal party structure (including a formal leadership), establish guidelines for funding the party's work and public disclosure of its finances, determine recruiting and membership strategies, and develop a policy platform that addresses constituents' needs and around which they can message and apply pressure to the political system. However, it will take time for Egyptians to trust a new political party system. In a society where people have been brutalized for simply expressing a political opinion, fear does not fade quickly. Even though the protests resulted in Mubarak's departure, a clear political opening and competitive landscape has yet to emerge.

Going forward, as parties try to recruit members, record their affiliations, and organize their campaign efforts, they will encounter wariness from the people. The tradition of political participation and public debate of policies will likely take time to emerge. For example, in many countries where political party public opinion polling is not as prevalent as it is in Western democracies, people are extremely hesitant to be interviewed and offer their uncensored opinions

for a pollster to record. People often assume that it is a tool the government is using to track their allies and enemies. Additionally, when non-local interviewers are involved, many people assume that the poll is an effort to collect intelligence information for foreign governments. Conspiracy theories abound when new techniques are introduced into a political system, so parties must proceed with caution and transparency.

DOMINICAN REPUBLIC: POLITICAL-PARTY ETHICS CODE

As political parties work to gain the trust of the people and demonstrate that their mission is to improve the lives of Egyptians, they should establish internal safeguards that promote ethical behavior, transparency, and accountability. Like many developing democracies, the Dominican Republic has experienced years of tumult in its political landscape. Opposition political parties have been marginalized, election results have been manipulated, and citizens' needs have been ignored. However, in the late 1990s, the major political parties came together to sign an agreement for electoral reform that has allowed consistent, peaceful elections rendering results that all parties have accepted. In recent years, individual political parties have undertaken initiatives to improve their transparency and accountability. For example, the Dominican Revolutionary Party created a party ethics code which serves as an agreement and guide when dealing with ethics violations within the party.² These steps improve the public reputation of political parties and, indirectly, of the democratic process.

FREE AND FAIR ELECTIONS: PLANNING, EDUCATION, AND MONITORING

Free and fair elections will be a major step forward in Egypt, but they are not a silver bullet and, if poorly managed, can actually set back the larger effort. In any democracy, elections are one mechanism intended to give citizens a voice and provide a direct link between the citizenry and the institutions that govern it. This civil right is intended to align the needs and desires of the people with their representatives and to peacefully direct the course of a country by indicating public policy priorities. But from a technical perspective, elections are also a test of a democracy. They provide insight into the strength of a country's institutions and the competitiveness of the political landscape. An unobstructed voting process yielding results that reflect the will of the voters and a peaceful transfer of

power serves as a testament to the stability of a country's democratic system.

However, holding elections on the heels of a revolution or civil war can have a deleterious impact on a healthy transition. If political tensions are at a height and legitimate democratic structures are not in place, elections will yield results that exacerbate political life. Prior to elections in Egypt, it would likely be beneficial to review the existing election law. Holding public dialogues with CSO leaders, parliamentarians, executive branch representatives, legal experts, and representatives from organizations and countries with experience in this area of reform would allow all stakeholders to participate and expose the public to the discussion.

“ *An unobstructed voting process yielding results that reflect the will of the voters and a peaceful transfer of power serves as a testament to the stability of a country's democratic system.* ”

While discussions commence about the legal framework and plans are put in place for democratic elections, political parties and CSOs should use that time to organize their own activities. Political parties could develop their platforms, recruit members, and create campaign strategies. The opposition parties will have a particularly difficult task. It is easy to demonstrate that they are anti-Mubarak or anti-regime. That fact alone has been enough to identify someone as a member of the opposition throughout the revolution. However, once elections are scheduled, it is no longer enough to say what you are against (i.e., Mubarak and the regime); parties will then have to indicate clearly what they are for. This is a more nuanced and detailed task, given that hundreds of opposition parties will likely emerge and will have to differentiate themselves from one another.

Civil society organizations must devote considerable time and resources to their voter education campaigns, creating election monitoring strategies, and holding voter

registration drives. The environment in which they will be operating will be unfamiliar, chaotic, and competitive. Like the opposition parties, hundreds of CSOs will emerge. The challenge for them will be to work together as a network, rather than duplicating one another's efforts needlessly. Also they will need careful strategies to reach diverse communities in Egypt. The outreach toward the youth population should be drastically different from that toward the elderly population. Similarly, the outreach efforts to those in Cairo will be much different from that to those in Aswan. Civil-society organizations will have to use creative means to educate people about voting and the elections, particularly when conducting outreach to illiterate populations. Some organizations in Egypt have already used skits and street theater to demonstrate the voting process for citizens. Similarly, in sub-Saharan Africa, CSO representatives often travel to rural areas carrying backpacks containing everything they need to demonstrate how to vote. They act out the experience and allow people to practice voting. This effort reduces intimidation, contributes to the habituation of voting, and encourages people to participate.

Additionally, to give the elections greater credibility, to increase public confidence, and to deter violence, monitoring efforts should be employed. Both domestic and international election observers as well as party poll-watchers should participate to represent the interests of Egyptians, the political parties, and the international community. Further, local CSOs and international organizations should conduct parallel vote tabulations in an effort to expose fraudulent activity.

Without a window of time to educate voters on any new election processes, to allow political parties to campaign, and to establish a voting infrastructure that is transparent and conducive to monitoring, citizens will likely have little confidence in the election. With thoughtful implementation, there is a better chance that elections will advance the democratic progress in Egypt rather than set it back.

AFGHANISTAN: MONITORING AND THE PERILS OF EARLY ELECTIONS

After years of international military, political, and financial intervention, Afghanistan remains in the fledgling stages of democratic development. The country demonstrates the perils of holding elections too early—before the establishment of the rule of law and the reform of political party law. Many pushed for elections in Afghanistan because it provided a public demonstration that

democracy had arrived and symbolized a new order in the country. Unfortunately, some viewed these elections as a success simply because they took place. The logistical and organizational challenges were so significant that carrying out the election felt as though it were a great achievement. However, the elections did not carry much political significance, and holding elections too early only allowed well-resourced men, some of whom were unscrupulous, to contest the elections on the basis of democratic principles to which they did not truly adhere. The flawed exercise had a negative impact on democratic governance by institutionalizing the existing weaknesses in the political system. Specifically, the system under which elections were held was designed to make political parties weak and therefore keep the parliament weak and unable to provide the proper check on the executive.³

This flawed election strategy squandered the most precious resource: the desire of the Afghan people to participate freely in their governance. This spirit was clearly reflected in the fact that, despite continued violence, millions of people turned out to vote in Afghanistan's 2010 parliamentary elections. A significant number of election observers—both international and domestic—monitored the election in nearly all the country's provinces. There were indications of fraud, as there were in previous elections, but observers reported that improvements had been made. However, most Afghans did not trust the electoral institutions or the election results they reported. Frustration with a system that does not reflect the will of the people or address their needs will, in time, result in a growing disenchantment with the government and the transition to democracy.

Following the elections, observers suggested that the Afghan government conduct a comprehensive review of the electoral system, as public confidence in the system rapidly declined. Specifically, an international delegation called on the government to make the country's two electoral institutions—the Independent Election Commission and the Electoral Complaints Commission— independent from the executive. While the security situation, access to polling stations, and widespread fraud remain enormous problems in Afghanistan, observers were able to participate in the elections and offer concrete steps to improve the process. Additionally, this provides an opening for international pressure to be applied to the Afghan government to implement reforms and move toward a more robust democratic system that meets its citizens' needs.⁴

CONCLUSION

Building a democratic system in Egypt will not be easy. The political situation is extremely fragile and could succeed just as easily as it could fail. The Egyptians, however, have started out well. They overthrew the leader peacefully, and groups with radically different visions of Egypt's future acted in unison. The reform movement thus brought about a momentous change in a relatively short amount of time. Political leaders, Egyptians, and the international community must now recognize that the transition to democracy—a system characterized by slow, incremental change—will require patience, thoughtful planning, and a spirit of great compromise.

It is clear that the international community has an important role to play in this transition. First, developed democracies and other external actors should bring Egyptian stakeholders together and encourage them to create a coherent institutional plan. Second, the countries which provide financial assistance to Egypt and the international political development organizations implementing programs on the ground should come together and work to develop a unified approach to providing assistance. Third, international political development organizations should help build the capacity of CSOs, the legislative and executive branches, political parties, and the election administration. This technical assistance can provide a framework for a democratic system.

While the international community can provide resources and assistance, the transition to democracy is in the hands of the Egyptian people. There is much to be done, but at least initially, Egypt should focus on the following three priorities. First, maintain

open and frequent communication with the public. The people of Egypt feel empowered and in control of their country following the departure of President Mubarak. If they are not regularly informed of plans and actions being taken during the transition, the caretaker government may find itself on the wrong side of the popular momentum.

Second, look to comparative examples of democratic transitions. Egypt is not the first country to experience a popular uprising and transition to democracy, and likely will not be the last. Calling on others who have experience in democratic reform will help leaders avoid mistakes made in the past and will allow them to apply lessons learned to their own unique situation. Third, Egyptian stakeholders must come together and develop a detailed plan for the transition. This plan should include concrete steps for reform of the legal framework and a timeline that allows CSOs and political parties time to organize and interact with citizens in advance of elections.

The events in Egypt have the world's attention. Democratic countries and energized activists living under oppressive regimes are hopeful that Egypt's transition is a successful one. While developed democracies, namely the United States, are invested in this transition, it would be a mistake for outside actors to get involved in the selection of any leaders or offer support for a specific political party. Rather, it is more appropriate and useful for external actors to help build local capacity and assist in developing the four key elements needed for a functioning democracy to take root: civil society, institutions of democratic governance, political parties, and a free and fair electoral process.

NOTES

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AGRICULTURAL INDUSTRIALIZATION, POLICY, AND CROP DIVERSITY IN THE U.S.: A PANEL DATA ANALYSIS 1978-2007

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ABSTRACT Farming practices in the United States have shifted dramatically over the past 30 years, trending toward increased use of factory farms and single crop production. Evidence has emerged that these types of input-intensive agricultural methods come at steep environmental, health, and social costs. This article examines the impact of federal and state policies on farm-ownership structure and crop diversity. The authors composed various county-level crop indices based on models suggested in existent literature in order to compare diversity trends across states from 1978 to 2007. Using data from the Census of Agriculture, the authors then analyze policy as a contributor to state agricultural landscapes, ranging from industrial monoculture to diverse cropping. This article focuses on the effects of state and federal policies on crop diversity as a vehicle for understanding the impact of government policy on agricultural sustainability.

After decades of U.S. policy promoting a shift in agricultural production from traditional, small-plot family farms to expansive, industrial farm units, evidence is emerging that industrial agriculture comes at steep environmental, health, and social costs. Through this debate, current consumer trends and public policies are beginning to reflect a preference for more ecological-minded farm practices, including local production and organic growing methods. In what many see as a long overdue food revolution, there are now agricultural practices promoting a new type of farm that is smaller, sustainable, and crop-diversified.

This paper focuses on the effect of state and federal policies on crop diversity as a way of interpreting its role in creating more or less sustainable agriculture. The analysis uses measures of crop diversity as the primary dependent variables of interest for the statistical model and as indicators of sustainable agriculture. By calculating crop-diversity indices, the authors analyze production trends from 1978 to 2007 to answer the question: How do state and federal farm policies affect the way agriculture is institutionalized and practiced? Surveying agricultural policy as reflected in legislation and through funding may help identify whether specific policies promote sustainable agriculture or monoculture, independent of ownership characteristics. The authors also analyze the effects of policy on other dependent variables that indicate size and ownership structure and consider those results in light of findings from the diversity analyses.

CONTEXT: AGRICULTURAL INDUSTRIALIZATION IN THE 20TH CENTURY UNITED STATES

Industrial agriculture as practiced during the 20th century adapted the principles of manufacturing production from the industrial revolution, focusing on profit maximization by expanding economies of scale and efficiency. In this fashion, farmers substituted capital for labor, farm units became larger and fewer, and work was routinized and organized around single tasks so that any remaining labor was based on exchangeable and replaceable units.

A major driver of agricultural shifts toward industrialization was heightened reliance on machines and technology to increase food-production density. Programs like loan distribution run through the Farm Credit

Administration helped farmers increase capacity in the face of changing demands and opportunities to increase productivity. In response to overproduction and price decreases, farmers grew more dependent on governmental price supports and crop subsidization. This combination of machines and market distortions encouraged actors to increase the size of farms and use of machinery and other inorganic inputs to capture efficiencies and circuits of public money. Paralleling these trends was a tendency toward product specialization through monocropping, creating profound structural changes whereby agricultural production became concentrated on fewer and fewer farms. Throughout the 20th century, average farm size in the U.S. steadily increased from 150 acres to more than 400 acres per farm, while the number of farms fell by several thousand.¹ See table 1 for national measures of U.S. farm variables for study years.

Though the average farm unit expanded in size, the total number of farms decreased for the period from 1978 to 2007. During this time, the total number of farms in the U.S. is upward parabolic, with levels in 2007 similar to those observed in 1978. In spite of the regain in number of farms, total farm acreage continued the downward trend that began in the peak year of 1950, while average farm size peaked in 1992 at 491 acres and decreased to a still sizeable 418 by 2007. The largest increase took place at the small farm level (less than 50 acres). Moderate increases also occurred at the very large farm level (greater than 2,000 acres). Medium-size farms, which tend toward higher crop diversity than those on either end, have decreased in number.² Ownership structures did not change as noticeably as farm size. Noncorporate family farm ownership stayed fairly constant through the years while corporate ownership increased 2.2 percentage points.

There are currently no state or federal laws legislating sustainable agriculture. The federal statutory definition of sustainable agriculture is

[a]n integrated system ... that will satisfy human food and fiber needs; enhance environmental quality and the natural resource base ...; make the most efficient use of nonrenewable resources ... and integrate, where appropriate, natural biological cycles and controls; sustain the economic viability of farm operations; and enhance the quality of life for farmers and society as a whole.^{3,4}

Farm characteristic	1978	1982	1987	1992	1997	2002	2007
Total farms	2,257,775	2,240,976	2,087,759	1,925,300	1,911,859	2,128,982	2,204,792
Total farm size (thousands of acres)	1,014,777	986,797	964,471	945,532	931,795	938,279	922,096
Average farm size (acres)	449	440	462	491	487	441	418
Total market value of sales (thousands)	\$2,826,649	\$2,353,680	\$2,061,966	\$1,995,684	\$2,111,828	\$1,920,796	\$2,468,404
Market value of sales (average per farm)	\$1,252	\$1,050	\$988	\$1,037	\$1,105	\$902	\$1,120
Farm ownership (%)							
Family or individual	87.1	86.8	86.7	85.9	86.0	89.7	86.5
Partnership	10.3	10.0	9.6	9.7	8.9	6.1	7.9
Corporation	2.2	2.7	3.2	3.8	4.4	3.5	4.4
Other	0.41	0.55	0.57	0.65	0.78	0.75	1.28
Farms by acreage (%)							
1-9 acres	6.7	8.4	8.8	8.6	8.0	8.4	10.6
10-49 acres	17.3	20.0	19.8	20.1	21.5	26.5	28.1
50-179 acres	33.6	31.8	30.9	30.3	31.0	30.9	30.0
180-499 acres	25.8	23.5	22.9	22.2	21.1	18.3	16.7
500-999 acres	9.4	9.1	9.6	9.7	9.2	7.6	6.8
1,000-1,999 acres	4.3	4.3	4.9	5.3	5.3	4.7	4.2
2,000+ acres	2.8	2.9	3.2	3.7	3.9	3.7	3.6
Farms by value of sales (%)							
Less than \$2,500	20.4	23.9	23.5	22.0	26.0	38.8	40.8
\$2,500-4,999	13.3	12.4	12.6	12.0	12.0	10.0	9.1
\$5,000-9,999	13.9	12.6	13.2	13.1	12.4	10.5	9.9
\$10,000-24,999	17.5	15.2	15.6	15.7	14.3	12.0	11.3
\$25,000-49,999	13.3	11.1	10.5	10.1	8.9	7.4	7.0
\$50,000-99,999	11.7	11.2	10.4	9.8	8.3	6.6	5.7
\$100,000-499,999	9.0	12.3	12.6	14.9	14.5	11.3	10.9
\$500,000+	0.8	1.2	1.5	2.4	3.6	3.3	5.3
Government payments to the farm sector (thousands)*	\$3,030,004	\$3,491,965	\$16,746,732	\$9,168,920	\$7,495,294	\$12,414,897	\$11,903,243

* Adjusted for inflation considering the CPI, base 2000

Table 1. National measures of U.S. farm variables for study years

Industrial and sustainable agriculture may be viewed as oppositional modes of farm production. One core measurable factor of differentiation between the two is crop diversification.⁵ Sustainable modal agriculture advocates diversification through multiple crops and crop rotation with residual benefits of pest control and maintenance of soil fertility that may reduce dependence on chemical pesticides and fertilizers. Crop diversification is aligned with various sustainable practices, such as minimizing tillage, reducing chemical inputs, limiting fossil-fuel consumption, and harvesting water. Therefore, the authors look to crop diversity as a useful measure to evaluate levels of sustainable agriculture. The agrarian notion of the pastoral family farm does not necessarily correspond to sustainability. Beyond the association of ownership type with a specific practice, this analysis attempts to determine if particular regulations affect diversity while controlling for farm size and structure. However, the authors also evaluated how those descriptors might attenuate sustainability results.

It was not until the 1980s that social scientists joined the debate over sustainable and industrial agriculture with quantitative studies, which informed agricultural knowledge and practices. During the 1980s, academic writers such as John Cobb wrote of how U.S. agriculture was in the midst of “the early stages of a shift of thinking from that which is based on a mechanical model to that which is based on an ecological model.”⁶ In 1985, C. Dean Freudenberger wrote about this paradigmatic shift from an agricultural attitude that “looks upon the land in modern, industrialized terms ... [and measures everything in] terms of production efficiency and profit generation ... [to one that contributes to the] beauty, health, and integrity of the biotic community.”⁷

Out of this more philosophical perspective came the economic-based research of Thomas Lyson and Rick Welsh. In their 1993 research paper, “The Production Function, Crop Diversity, and the Debate Between Conventional and Sustainable Agriculture,” they directly examined the link between

crop diversity and the two modes of agricultural production. “Measuring crop diversity on harvested cropland within a county provides insight into the nature of agricultural production in that county....”⁸ This paper sets the baseline for our research into state policies and crop diversity. It uses county-level data for the lower 48 states from the 1978, 1982, and 1987 agricultural censuses and categorizing the concentration of harvested cropland in a county by the two types of agricultural production. Their results show conclusive linkages between industrial methods of production with lower levels of crop diversity. They conclude:

Increases in expenditures for equipment and machinery, the prevalence of corporate farms, higher rates of tenancy, and the prevalence of larger farms all are associated with less diversity of crops grown. Conversely, there is a greater diversity of crops grown in counties in which farm labor expenditures are higher, where there are more medium-size farms, and where there is a prevalence of farmers who derive most of their income from farming.⁹

Agriculture that is less oriented toward mass production preserves the relationship between farms and the social and natural contexts in which they exist.¹⁰

The existing literature suggests positive environmental and economic implications associated with increased crop diversity. There are several environmental benefits,¹¹ such as resistance to pests and resilience to changes in rainfall patterns. Equally, there are several potential economic benefits, such as higher mean income and less variability. Crop diversity may also function as a financial-risk-mitigation strategy, potentially compensating farmers for forgone cost advantages of crop concentration.^{12,13}

A recurrent theme in the literature is that while diversity may provide benefits to society, economies, and the environment,¹⁴ farmers are not adequately compensated for responsible choices.¹⁵ Consequently, as farmers rationally tend to underinvest in conservation strategies, including diversity, government intervention may be justified to remedy this situation.¹⁶ However, when diversity is also associated with higher productivity,¹⁷ the gap between private and public benefits is reduced.¹⁸

If higher wages from off-farming activities increase the opportunity cost of farming activities, labor-intensive processes like those required to maintain crop diversity would more likely be displaced by other inputs prominent in unsustainable agriculture.^{19,20} Industrialization encourages farmers to expand their operations and standardize production processes in order to increase efficiency by capturing economies of size and scale.

There is a trade-off between farm size, specialization, and risk mitigation.²¹ If specialization, i.e. monoculture, leads to economies of scale, the forgone return associated with diversity may be so large that monoculture will remain as an attractive and rational decision. Additionally, if farm size is associated with ownership structure, potential for vertical integration may reinforce the case for monoculture. For example, a corporation interested in risk-averse strategies could achieve its objective by expanding in sectors in which it operates and still balance the risks associated with specialized agriculture. If such rationality pays off, corporations and large-scale farms may be prone to engage in industrial agriculture characterized by monoculture.

Specialization is also the result of intensive capital utilization. Since the path to crop diversity is labor-intensive, it requires the substitution of capital with labor, a process that is easier for medium farms compared with large farms, since medium farms typically use less equipment and may be more flexible and responsive to changes in local demand.²² Theoretically, very small and very large farms will be engaged in monoculture because of limitations of scale and economies of scale correspondingly, while midsize farms have more flexibility to be crop diverse.

POLICY CONTEXT

National and state policies have played a significant role in shaping the U.S. agricultural landscape. Regulations such as crop subsidization, tax policies, and corporate regulatory laws affect farm decisions regarding crop production and business structure. For several decades, short term productivity has grown along with industrialization. While increased food production is a laudable goal, policies that encourage such shifts deserve scrutiny. Politically, powerful interests shape national and state farm legislation. These special interests often diverge in goals and strategies,

resulting in a complex, substantial, and sometimes contradictory regulatory framework.

Federal and state policies shape the decisions of individual farms and the industry as a whole. Investigating federal policy creates a context for analysis of changes that may affect all states. This analysis also examines the effect of state policy on agricultural trends to assess whether states play a role in regulating crop diversity and, if so, to what magnitude. Changes in national policy can be less responsive to emerging trends and local needs than state policy reforms. State and local policies offer platforms for encouraging responsible farm practices, should legislators choose to pursue them. Given current concerns over health and environmental implications that may accompany increased industrialization, understanding the impact of state policy is fundamental to crafting informed farm legislation.

The team examined multiple policies to answer the research question. After this preliminary research, three policies emerged as quantifiable, varied across state and time, and statistically significant in ways warranting further examination. The following sections examine the three main policies of interest in this paper: federal farm subsidies, state tax burden, and anticorporate farm laws. Policies determined to not lend themselves well to this analysis include state enforcement of the Packers and Stockyards Act (1921), right-to-farm laws, pesticide and fertilizer regulation, pre-emption laws, and biofuel subsidies. Each of these may be worth further consideration, as they offer potential stories for how policy may affect the agricultural landscape.

FEDERAL FARM SUBSIDIES

The federal government subsidizes agricultural production in a number of ways that significantly shape the farming landscape in the United States. This amount varies greatly by year but represents billions of dollars in federal spending annually. To date, payments in the 21st century have ranged from nearly \$12 billion in 2007 to well over \$24 billion in 2005.²³ Farm subsidies incorporate direct payments, loans, transition programs, countercyclical payments, emergency assistance, deficiency payments, some conservation programs, and more. Approximately one-third of farms receive federal subsidies, and allocation of these payments favors certain commodities, types of farms, and regions.²⁴ According to a 2002 Congressional Research Service report, the top five percent of farms receiving crop subsidies were given half of the total pay-

ments made in that year. These payouts were highly concentrated in the Midwest and Texas.²⁵ Top commodities for which direct payments were made to farmers in 2007 were corn, wheat, cotton, soy, rice, sorghum, barley, and peanuts.²⁶

The Farm Bills, which have been released at intervals since the Agricultural Adjustment Act of 1933, determine farm subsidies. Farm Bills cover a number of policy areas, from food assistance to conservation programs, and are important in specifying which crops are subsidized and how payments are made. Agricultural subsidies were initially included in the Farm Bills as compensation for diminished income to farmers because of the stresses of World War I and the Great Depression. In the mid-1960s, subsidies were restructured to encourage more of a market model and promote food exports.²⁷ Theoretically, market-oriented policies continued through the remainder of the century, and in the 1980s, there was a higher reliance on loan programs than in previous years.²⁸ Additionally, the 1985 Farm Bill (Food Security Act) reduced price supports, encouraged more production on previously idled land, and began to ease restrictions on planting related to subsidies.²⁹

The Farm Bill released in 1996, the Federal Agricultural Improvement and Reform (FAIR) Act, substantially changed the allocation of commodity payments by decoupling price supports with the intention of further supporting a free-market framework of subsidy allocation. Before this legislation, Farm Bills specified a direct payment increase when market prices fell to compensate farmers for deficits. With the FAIR Act, direct payments to farmers were decoupled, meaning they were no longer tied to current production but rather fixed based on acreage historically allocated to commodity crops. Along with other important changes, the bill allowed for more flexibility in which crops could be grown on commodity program land.^{30,31}

Despite the liberalizing rhetoric around the farm bill, direct payments to farmers after 1996 have remained substantial. Although payments were supposedly fixed and therefore should not have caused market distortion, in reality, when commodity prices fell, legislators responded to political pressures by setting up ad hoc payments to further subsidize crops. Along with the fact that loan programs were still responsive to market fluctuations, this meant that crop subsidies did not decline.³² In the U.S.,

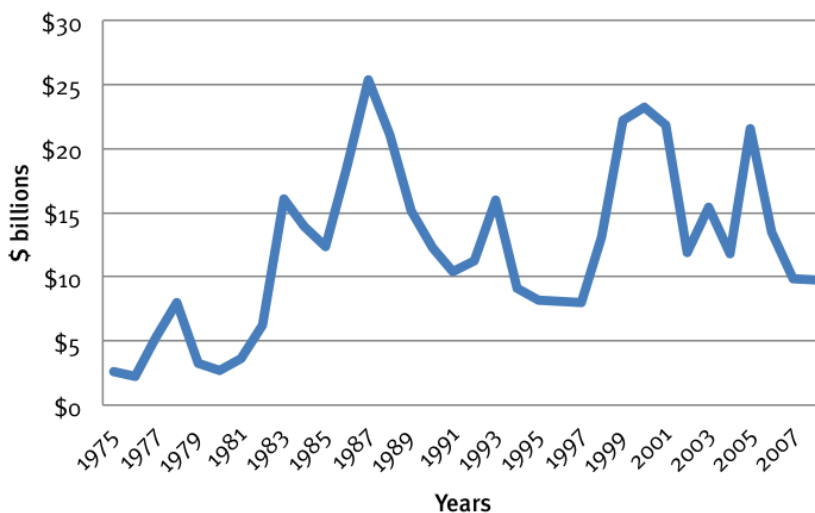


Figure 1. Federal farm subsidies 1975-2008, adjusted for inflation³⁵

Source: USDA Economic Research Service

direct payments to farm bills from 1999 to 2001 alone totaled more than \$20 billion annually.³³ The 2002 Farm Bill extended the ad hoc legislation tying subsidies to market fluctuations and also allowed farmers to claim updates on historical acreage. Effectively, this basis for payment reflected near current production, further weakening the realities of decoupling. Research shows that corn, soy, and wheat crops were still responsive to subsidies after the decoupling under the FAIR Act.³⁴ Figure 1 shows farm-subsidy trends throughout the timeframe of this paper.

Analysis of the data from the Census of Agriculture reports shows that U.S. Department of Agriculture (USDA) regions 3, 4, and 8, representing the Midwest and Texas, are highly positively correlated with share of federal subsidies. The Northeast and the Southwest regions are negatively correlated with share of subsidies.³⁶ Commodity crops that command subsidies are mostly grains like corn and soy, while government payments specifically discriminate against production of fruits and vegetables.³⁷ Additionally, evidence in the literature shows that farm subsidies tend to disproportionately benefit larger operations,³⁸ so increased subsidies may encourage growth of large farms that are more likely to engage in nondiverse cropping practices at the expense of smaller more diverse farms.³⁹ Federal subsidies may work to specifically discourage crop diversity by supporting only certain producers and encouraging profit maximization through production of select commodity crops.

STATE AND LOCAL TAX BURDEN

Different analytical mechanisms, including statistical analysis and general-equilibrium models, are useful when considering the effect of agriculture taxation more generally. Results from both approaches indicate that taxation is likely to affect the way production decisions are made and may specifically influence the selection of input combinations (technology).⁴⁰ Consequently, lower taxes are a frequent strategy for attracting resources to agriculture but also for determining the balance between land, capital, and labor in agricultural production. Tax benefits for farmers may encourage growth of larger-scale farms.⁴¹

One may argue that taxing agriculture is a way to internalize the negative externalities caused by agricultural production. In that sense, as farming can produce noise and odors deemed offensive and thus impose costs to neighbors, like declining values of surrounding property, those expenses may be internalized and redistributed as benefits to the community through taxation and other regulations.

From 1978 to 2007, agriculture benefited from several specific tax provisions granted through preferential treatments, differential assessments, and depreciation allowances, as well as general tax policies like those adopted in the 1980s under the economic-recovery program. The findings of significant studies on how income tax provisions affect farmers' decisionmaking process do not show consistent results.⁴²

From a federal perspective, the most important taxes for farmers are the income, self-employment, and the estate gift taxes.⁴³ Tax policies may drive other factors at the farm level, such as technology adoption, labor contracting, and scale. Simultaneously, those for whom agriculture is the only or most important source of income often do not generate enough taxable income, farm or non-farm, to fully use available tax benefits. Across the farming sector, federal tax policies affect land prices, the relative cost of capital and labor, input allocation, size, organizational structure, management practices, and product supply.⁴⁴ Partial equilibrium analysis that isolates tax effects from other economic decisions already indicates that changes in tax policy can be expected to affect agricultural investment. In particular, removing some investment tax credits like those adopted under the Economic Recovery Act of the early 1980s could have decreased total agricultural investment and promoted a shift to other land uses.⁴⁵ In his paper “Impacts of Federal Tax Policies on Potential Growth in Size of Typical Farms” Charles Eginton states, “The highly mechanized, capital-intensive farms grew at rapid rates due to the depreciation allowance; the net effect over the long run was to encourage the use of capital relative to labor, thus exacerbating the trend to increased size and reduced number of farms.”⁴⁶

Isolating federal tax policies from state and local taxes could provide a framework for analyzing the impact of state and local governance on individual and corporate decisions to engage in agriculture or not, and what type of agricultural practices to use. Local government reliance on property and land taxes provides incentives for the development of land. The fact that there are positive and negative externalities at the state and county level associated with agriculture suggests that there must be nonfederal policies for addressing these spillovers, creating an opening for state and local regulation to integrate unaccounted costs and benefits of agriculture.⁴⁷

All states provide preferential treatments to land taxation through assessments or current use values, and consequently, agriculture pays a relatively small part of total real property taxes in the U.S.⁴⁸ Nonetheless, farm-labor earnings, proprietor income, and corporate farm income constitute part of the economic base that state and local governments tax.⁴⁹ Analysis of state and local tax structures may provide elements for understanding the presence of capital-intensive large-scale agriculture.

The tax burden measure calculated by the Tax Foundation uses revenues collected by state and local governments as a proportion of the total income reported in the state in a given year. The advantage of a tax burden measure that goes beyond the statutory rates is that it captures differences in real costs of doing business by location. In addition, the tax burden measure includes taxes as recorded by the Census Bureau and also adds special assessments and revenue from occupational, business, and motor-vehicle license fees.

ANTICORPORATE FARM LAW POLICY CONTEXT

Several states have passed statutes or constitutional amendments that regulate against certain corporations from engaging in farming, either in the form of purchasing land used for agricultural production or involvement in the production of commodities. Anticorporate farming laws were adopted in nine states in the 1970s and early 1980s, placing restrictions on corporate ownership of farmland and on vertical integration of food-production firms.⁵⁰ Until 2003, the nine states that restricted or prohibited corporate farming were Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, and Wisconsin.⁵¹ Each of these states’ statutes emphasizes the founding principle to secure the social fabric of rural America by protecting the economic viability of family farms.⁵²

Another reason for these statutes is that corporate farms are more likely than family farms to practice modern industrial agriculture and thereby cause environmental damage. On this level, anticorporate farming laws, while not directly legislating sustainable agricultural practices, should prohibit the more environmentally damaging practices of industrial agriculture. Opponents vigorously decry that not only are these laws anticapitalistic but they are also ineffective and unconstitutional in that they impede free trade between states. This research does not focus on the constitutionality of anticorporate farming laws or the political debates around them. Of fundamental concern is whether they are effective in legislating against industrial agricultural practices by limiting or prohibiting the presence of corporate farms and if the presence of these laws impacts crop diversity.

According to a memorandum distributed by the Community Environmental Legal Defense Fund, there is a serious need to limit corporate involvement in farm-

ing.⁵³ The corporatization of American agriculture is well established: Four corporations control 82 percent of the nation's beef market, five major packers control 55 percent of the hog industry, and there are 300,000 fewer farmers than there were 20 years ago.⁵⁴ The nine states that have anticorporate farming statutes receive 30 percent of all U.S. agricultural revenue and therefore constitute significant agricultural interests. As agricultural policy, these laws have the potential to have a significant impact on farm size, structure, and crop diversity, and they deserve extensive research.

The fundamental assumptions behind protecting family farms by preventing the further corporatization of agriculture are enveloped within an agrarian view of life, which is intricately bound with the foundational self-image of the U.S. In his historical essay on American agriculture, Richard Kirkendall wrote, "This heritage maintained that farming was the best way of life and the most important economic activity,

“*The authors hypothesize that federal subsidies attract corporate and large farms, and that these farms decrease diversity. Subsidies also act to decrease diversity directly by explicitly encouraging farmers to produce subsidized crops at the detriment of other plants.*”

that it conferred psychological as well as economic benefits, and that it produced the best citizens.”⁵⁵ Thus the proponents of the family farm have argued persuasively in these nine states that the corporation has no place in agriculture.

While this agrarian view is difficult to monetize, a strong economic argument does exist for limiting corporate farming. The financial capacities of corporations create an unfair and unlevel playing field on the farm. Corporations have additional sources of funding, such as equity financing or debt financing, that are not available to the

individual. Besides this, banks demonstrate preferential treatment in lending capital to corporations over noncorporate entities. With the mechanization of agriculture, access to these funding sources are crucial not only to growth but survival.

The stringency of anticorporate farm laws varies by state, and for many states these laws have over time become weaker in their scope and ability to enforce limitations.⁵⁶ Since anticorporate farm laws theoretically restrict direct corporate involvement in farming, they may exert some influence over crop choice. Limited research indicates that these laws have worked to slow agricultural industrialization and may be beneficial to local communities and the environment.^{57,58}

After first testing whether anticorporate farm laws are effective at reducing the presence of corporate ownership of agricultural land, the authors then analyze the causal connections between ownership and sustainability. The research hypothesis holds that the family farm that practices sound ecology is something of an American myth. This is not to say that there is necessarily a uniform causal mechanism between ownership and specific agricultural practices. If crop diversity does not decrease in the face of corporate ownership, the causal connection between ownership and sustainable practices is not stable. We hold farm size to be a much more important prompter of sustainable practices than ownership type. One fundamental reason behind our policy analysis of anticorporate farm laws is to understand the link between ownership and the practice of specific agricultural techniques.

There are exceptions built into the anticorporate farm laws that allow for the involvement of certain types of corporations and may render the laws ineffective in prohibiting corporations from farming. This would disrupt specific parts of the anticorporate-farm-law causal model. Kansas and Missouri provide typical examples of these exemptions. The Kansas legislature voted in 1995 to allow counties to opt out of the anticorporate farm laws and allow agricultural land to be held or leased by a corporation for use as a dairy-production facility or to establish a swine-production facility.⁵⁹ It also reversed the initial prohibition against contract farming. Most of the structural exceptions to Kansas's anticorporate farm law simply require limitations on the number of stockholders and the blood relations among the stockholders, and it stipulates that at least one stockholder reside on the farm or manage its operation.

In 1993, Missouri exempted three counties from its anti-corporate farm law because the counties had less than 7,500 inhabitants.⁶⁰ Furthermore, the law includes two major exemptions—the family-farm corporation and the authorized farm corporation. The first exemption holds that the family corporation has similar requirements for shareholders seen in the Kansas legislation. The second exemption requires of the authorized farm corporation that all shareholders be natural persons and that two-thirds of the corporate income come from farming (not a specific farm but from farming). Missouri exemplifies some other fairly common exceptions, such as allowing for the possibility of expansion of corporate farms owned before the enactment of the anticorporate farm law. It also exempts certain agricultural productions such as winemaking, production of poultry or poultry products, fishing, and mushroom farming. It also allows for establishment of non-profit corporate farms and those that perform experimental research on genetically modified hogs.

South Dakota's history with anticorporate farming legislation also provides a spotty record, pointing to the relative ineffectiveness of such legislation at stopping the growth of corporate influence. South Dakota originally passed its anticorporate farm law in 1974, but over the following few decades, it was deemed ineffective by many local farm groups because of the many exceptions. In 1989, the attorney general exempted many large corporations, completely rendering South Dakota's anticorporate farm law nonexistent.⁶¹ Then, in 1998, Amendment E was added to the state's constitution through popular ballot and became one of the strictest anticorporate measures in the nation. In 2003, Amendment E was ruled unconstitutional and in violation of the Interstate Commerce Clause, leaving South Dakota open to corporate agriculture.

CAUSAL MODEL

This report examines three distinct policies, one federal and two that are more locally determined. The authors hypothesize that federal subsidies attract corporate and large farms, and that these farms decrease diversity. Subsidies also act to decrease diversity directly by explicitly encouraging farmers to produce subsidized crops at the detriment of other plants. The state tax burden and anticorporate farm laws should work the opposite way, deterring corporate and large-scale agriculture and thereby promoting crop diversity.

The policies that assign federal subsidies are not product neutral. Consequently, some products are eligible to obtain payments from the federal government while others are not or are actively discouraged. Since corporations are profit-oriented, it is possible to establish a causal pathway through which the existence of government payments attracts corporations to be engaged in agriculture. The authors hypothesize that federal subsidies attract corporations and cause industrial agricultural practices to expand, thus reducing product diversity. In addition to corporate presence, federal subsidies may encourage and disproportionately support larger farms, and therefore may encourage industrial nondiverse agriculture. However, it is also possible to think that the effect of federal subsidies on the small farm is magnified when low crop prices and/or high debt drive farmers to grow subsidized commodity crops. Federal subsidies increase monoculture on the family farm. Consequently, the logic model suggests both direct and indirect effects of subsidies on reducing diversity.

A higher state tax burden increases the cost of running businesses, including agriculture. In this case, corporations may try to avoid establishment in a state where the tax burden is comparatively high, and in turn individual or family farms may be more prevalent. The tax burden measurement shows an effective state and local average tax rate.⁶² For the purposes of this study, this measure provides a basis that signals which type of agriculture could be practiced based on how the state and local taxes favor corporate and/or large-scale farming. If fewer corporations and/or large-scale farms settle in a given state, industrial agriculture is less likely to occur and crop diversity will prevail. If higher taxes are a vehicle for driving away corporate and large-scale farming, more ecological farming is expected.

The presence of anticorporate farming laws should inhibit corporate ownership of agricultural land. This analysis tests whether the existence of such laws effect changes on crop diversity, with the expectation that negative trends in diversity may be reduced by the existence of such laws. If corporations are more likely to practice industrial agriculture, corporate farms would tend toward monoculture. Therefore there should be more crop diversity in states that have anticorporate farming laws than in states that do not. This analysis also examines whether anticorporate laws actually

Hypothesized Causal Model

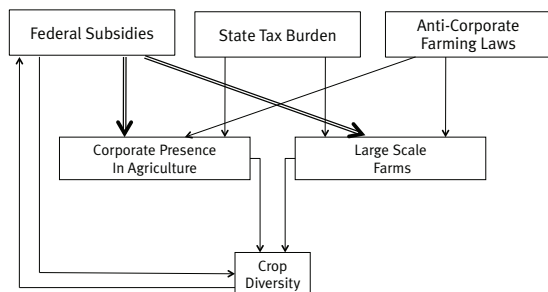


Figure 2. Hypothesized Causal Model, Policies on Crop Diversity

reduce corporate presence in comparison with states without such regulation, and how these laws might work on crop diversity through size variables. Anticorporate farming laws should establish barriers for corporations to engage in agriculture. As corporations' share decreases, intensive agricultural practices are implemented less frequently and higher crop diversity will result.

Figure 2 graphically represents the hypothesized causal model underlying the analysis, as described above. A double line indicates a positive relationship between entities, while a single line denotes negative influence. For example, the arrow from federal subsidies to large-scale farms signals a positive hypothetical relationship, so that higher subsidies will result in more big farms. In turn, more large-scale farms negatively impact crop diversity. According to this model, federal subsidies should also directly result in lower crop diversity for reasons independent of farm size or structure.

DATA MEASURES AND INDICES

For this analysis, data were culled from a variety of sources in order to compose the dependent and independent variables for this analysis. The majority of data for this project were drawn from the USDA Censuses of Agriculture for the period 1978 to 2007. Starting in 1982, the census was conducted every five years. County level data for 1978 to 1997 were provided by the National Agricultural Statistics Service, USDA upon request.⁶³ Data for 2002 and 2007 were accessed through the 2007 Desktop Data Query Tool 1.02, available at the agricultural census website. USDA data reporting has varied substantially across the

timeframe of this project. Notable changes were observed for the 2002 and 2007 data, which provide a more comprehensive accounting for all farms. Though greater detail is available on total farms and farm structure, crop sales information is less comprehensive than in previous years, reducing usability of sales data. The data set compiled for this project includes 343 state-year observations, representing one for each of the 50 U.S. states for each year from 1978 to 2007. It does not include Alaska, which was dropped due to sparse data reporting, changes to county classification, and demonstration of extreme outlier characteristics.⁶⁴ See table 2 for various descriptive statistics on independent and dependent variables.

DEPENDENT VARIABLES: OWNERSHIP AND SIZE STRUCTURES

It is essential to understand the mechanisms through which state and federal policies provide incentives or establish obstacles to engage corporations in agriculture or to create favorable conditions for development of large-scale industrial farming. As the hypotheses indicate, the presence of either corporately owned or very large farms may threaten the prevalence of practices that promote diversity. In order to address that pattern, the first analyses deal with size and structure as dependent variables. The Agricultural Census provides actual numbers of farms and acres that are owned by individuals/families, corporations, partnerships, or other types of arrangements (trusts, cooperatives, etc.). Based on this information, it is possible to construct two main variables that will guide the first set of regressions in the analysis. Those variables are:

$Corpacre_{it}$ = Share of total agricultural acres owned by corporations

$Corp_{it}$ = Share of total agricultural farms owned by corporations

Where i and t stand for the state and time subscripts. These indicators capture the evolution of corporate influence in the agricultural development of each state. Following the logic model, this presence should negatively affect crop diversity.

Besides corporate ownership, scale may be another driving force of monoculture. In order to measure that influence, using the breakdown by size of farms avail-

Variable	Share	Mean	Median	Max.	Min.
<i>Dependent variables</i>					
Ownership structures and characteristics					
Share of acres owned by corporations		0.138	0.106	0.770	0.006
Share of farms owned by corporations		0.047	0.042	0.144	0.003
Share of farms larger than 2,000 acres		0.044	0.014	0.317	0.000
Share of farms larger than 1,000 acres		0.090	0.047	0.470	0.002
Indexes based on acreage					
NAICS - acres index		0.451	0.432	0.939	0.254
USDA detailed product - acres index		0.338	0.343	0.623	0.146
Indexes based on sales					
NAICS to the fourth digit - sales index		0.487	0.478	0.889	0.165
USDA detailed product - sales index		0.436	0.425	0.421	0.221
Plant concentration - sales index		0.590	0.559	0.968	0.271
Indexes based on farms					
USDA detailed product - farms index		0.116	0.114	0.257	0.027
Count of number of crops per farm		2.887	2.805	5.493	1.152
<i>Independent variables</i>					
Policies					
States with anti-corporate farming laws	0.21				
Federal subsidy share		0.020	0.010	0.173	0.000
State tax		0.096	0.096	0.124	0.066
Controls					
Precipitation		37.21	40.78	84.49	6.94
Mean temperature		52.84	51.80	72.60	38.10
Unemployment rate		0.060	0.060	0.155	0.023
State GDP share		0.020	0.013	0.133	0.002
Share of farms using contract labor		0.101	0.089	0.345	0.025
Share farms farming is primary occupation		0.537	0.520	0.845	0.360

Table 2. Descriptive statistics of dependent and independent variables ($N = 343$)

able in the Agricultural Census, the authors calculated two variables to represent large-scale agriculture.⁶⁵

$Lgfarm_{it}$ = Share of total agricultural farms with more than 1,000 acres.

$Verylgfarm_{it}$ = Share of total agricultural farms with more than 2,000 acres.

These two variables complete the potential drivers of monoculture.

DEPENDENT VARIABLES: DIVERSITY INDICES

There is an extensive ecologic and economic literature on how to measure diversity. A comprehensive measure of diversity should include both richness and concentration. A simple count of the number of species (frequently used for ecological purposes) may be a good indicator for

richness within an ecosystem, but does not provide any illustration in terms of concentration.

Other indices use alternative measures for the proportion of area planted with the top varieties or the number of varieties accounting for a given percentage of cultivated area. Indices based on economic literature like the Herfindahl index—the sum of squared shares of total crop area planted to each unique variety—are commonly used for measuring diversity. The Shannon-Wiener index and the Simpson index are also based on spatial diversity. These indices measure proportional abundance of specific products; that is, they combine indicators of crop-population richness as well as abundance. Dominance indices, such as Simpson and Herfindahl, are relevant particularly for intervarietal diversity, because they provide a measure not only of the number of distinct populations planted but also of their relative importance.⁶⁶

In addition to spatial diversity, economic diversity based on the sources of income may also be a useful indicator. Although the mechanics of the indices may be similar to those used under a spatial perspective, the common unit of analysis is no longer a spatial one but a monetary measure, typically net income or sales income.⁶⁷

Calculation of crop diversity could be made at county, state, and national levels. Though crop diversity at the farm level would have been an ideal variable, USDA restrictions on data access prompted by proprietary concerns prevented access to such detail. Instead, we calculate county-level diversity as a proxy based on product mix and build weighted averages in order to provide a state-level representation of farm diversity within a particular state in a given year. The alternative, using state-level data to calculate an index, may lead to inaccurate results due to aggregation. In other words, although the overall state may look diverse, each single farm within it may be engaged in monoculture. Since farm-level data is unfeasible and state-level data risks overgeneralization, county-level data is the best alternative and one that is commonly used as the unit in ecological analysis.⁶⁸

The specific variables of analysis are:

- (1) A spatial diversity index (Herfindahl index) with the data based on acreage.

Herfindahl Index of products based on acreage coverage = $\sum \rho_i^2$

Where ρ_i is the proportion of acres cultivated with crop i within the specific unit of observation. The index is calculated for every county and a state indicator is obtained through a weighted average based on each county's acreage contribution to total state farmland. This index is measured on a 0 to 1 scale, where 0 means complete diversity and 1 indicates a scenario in which one crop covers all the acreage or accounts for 100 percent of the total sales. A lower value on the Herfindahl index indicates a more diverse agriculture.

The main advantage of this indicator is that it takes into consideration both the number of crops and the relative importance based on acreage coverage. A limitation is that it only considers crops and not livestock or animal products such as eggs or dairy.

- (2) A count of the total number of products per farm

The second indicator of diversity is a simple count of the average number of products per farm, both plants and animals, in each state. This measure is closer to that usually referenced in ecological studies and can be calculated by a simple formula:

Number of products/farm =

$$\sum_{i=1}^k \frac{\text{Farms producing product } i}{\text{Total number of farms}}$$

Again, the measure is calculated for every county and a weighted average for each state is obtained using the share of sales as the proper weight.⁶⁹ For this measure, a higher number indicates increased diversity, so that the oppositional directions between this variable and the spatial diversity index capture similar ideas.

A higher number of average products per farm indicates greater diversity. This dependent variable on diversity is a simple measure to interpret, as it captures the average number of crops and livestock products per farm. However, it is limited in that it does not take into consideration the relative importance of each product, either through acreage or economic participation.

INDEPENDENT VARIABLES: COVARIATES

Several significant covariates are included in the full regressions, capturing geographic, economic, and social characteristics of the states. Since crop production and diversity are sensitive to weather, each adjusted regression controls for precipitation and average temperature. Precipitation is taken as a three-year average of annual rainfall inches for that year and the two years prior. The temperature control is an average Fahrenheit temperature for the year represented. Both of these measures were obtained through LexisNexis.⁷⁰

In order to control for important state economic factors, variables are included for the unemployment rate and state GDP in the state-year. Data on unemployment were obtained through the U.S. Department of Labor⁷¹ and are calculated as a rate. State GDP, as reported by the Bureau of Economic Analysis,⁷² is formatted as the share of state gross domestic product out of the total national GDP. Including this measurement as a ratio obviates the need to account for inflation and gives a relational perspective of the states.

Farm-specific indicators taken from the Census of Agriculture are included to control for varying factors, as well as to get a sense of the significance of these variables on the dependent measures of size, structure, and diversity. When not represented as a main independent policy variable, share of federal farm subsidies is included as a control in all regressions. Measures of farm size and ownership are also included as control variables. In analyses of policy effects on large farms, a covariate is included for share of acres owned by corporations, in order to control for and examine corporate presence. When the dependent variable is a measure of corporate ownership and diversity, the authors control for the presence of very large farms by including a variable that represents the share of total farmland in farms that are 2,000 acres or larger. Variables that measure the proportion of farms in the state that use contract labor and the proportion of farms where the principal occupation of the owners is farming are also included. Prevalence of contract labor may indicate a more corporate structure and a certain degree of vertical integration, while previous research suggests that farming as a primary occupation may be strongly related to crop diversity.

Region controls are included in a number of the regressions in order to account for geographical variations that may not be captured through the other controls noted above. This analysis uses the USDA's division of farm production regions in order to assign a region to each state. Though this accounting is broader than the land resource or farm resource regions delineated, it is a useful measure for these purposes as the lines are drawn along state borders. As a result, the measure may capture regional complexities beyond those specifically related to agriculture. There are 11 regions, which are codified as binary variables and used as dummies in regressions with region controls, with region 0 (Alaska and Hawaii) as the referent region.

METHODOLOGY

Multivariate regression analysis was conducted on policy variables in order to test the causal pathways hypothesized in the model. Equations used for each of the primary models are detailed below. The first set of regressions examines the impact of the policies on the involvement of corporations in the ownership of agricultural land (equations 1 and 2).

- (1) $Corp_{it} = \alpha + \beta(Policy_{it}) + \delta_{1,2,...,k}Cov_{1,2,...,kit} + \varepsilon_{it}$
- (2) $Corpacre_{it} = \alpha + \beta(Policy_{it}) + \delta_{1,2,...,k}Cov_{1,2,...,kit} + \varepsilon_{it}$

The second set of regressions attempts to analyze the effect of the policies on the prevalence of extensive agriculture as measured by the share of large (greater than or equal to 1,000 acres) and very large (greater than or equal to 2,000 acres) farms (equations 3 and 4).

- (3) $Lgfarms_{it} = \alpha + \beta(Policy_{it}) + \delta_{1,2,...,k}Cov_{1,2,...,kit} + \varepsilon_{it}$
- (4) $Verylgfarms_{it} = \alpha + \beta(Policy_{it}) + \delta_{1,2,...,k}Cov_{1,2,...,kit} + \varepsilon_{it}$

The final step in the analysis relates each of the policies to the measure of diversity as stated in equations 5 and 6.

- (5) $DiversityIndex_{it} = \alpha + \beta(Policy_{it}) + \delta_{1,2,...,k}Cov_{1,2,...,kit} + \varepsilon_{it}$
- (6) $Productsperfarm_{it} = \alpha + \beta(Policy_{it}) + \delta_{1,2,...,k}Cov_{1,2,...,kit} + \varepsilon_{it}$

All estimates were initially run using ordinary least squares (OLS) methodology.⁷³ Due to the presence of heteroskedasticity (nonconstant variance in the residuals of the OLS estimation), robust regression⁷⁴ estimates were then performed, and those results are reported in the adjusted columns in results tables below. Calculations were also made using region and time effects, and those are reported here, as they provide a better estimate by capturing homogenous socioeconomic and ecologic patterns.⁷⁵

CONSTRUCTION OF POLICY VARIABLES

Federal subsidy share: The variable for federal farm subsidies represents the state share of total payments to U.S. farms made by the federal government. It is calculated by dividing the total payments reported by the USDA Economic Research Service in nominal dollars into the figure assigned to each of the 50 states. This is a lagged variable that averages state farm subsidies for the two previous years. Using the two year lagged average helps to smooth out some of the yearly variance in federal subsidies. The federal farm subsidy share variable is useful in determining how payments are allocated among states, regardless of subsidy amounts for the year. Lagging this measure allows for more confidence in making causal observations, though the cyclical nature of federal subsidies prevents the use of fully causal statements in this paper.

State and local tax burden: The state and local tax burden is reported as a rate based on the one to

Panel 1: Ownership and size												
Variable	Share of farm acres owned by corporations			Share of farms owned by corporations			Share of farm acres from farms with > 1,000 acres			Share of farm acres from farms with > 2,000 acres		
	Not adjusted	Adjusted	Region & time effects	Not adjusted	Adjusted	Region & time effects	Not adjusted	Adjusted	Region & time effects	Not adjusted	Adjusted	Region & time effects
Policy: Federal subsidy share (standard error)	-.461** (.161)	-0.373** (.143)	0.126 (.151)	-.300** (.062)	-0.343* (0.058)	0.054 (0.053)	.889** (.067)	0.742** (0.078)	0.372** (0.507)	.335** (.033)	0.235** (0.037)	0.146** (0.020)
Covariates												
Precipitation, 3 year mean		0.001	0.001		0.000	0.000		-0.002**	0.000		-0.001**	0.000
Mean temperature		-0.002**	0.005**		0.000	0.002**		0.002**	0.000		0.001**	0.000
Unemployment rate		-0.156	-0.387*		-0.237**	-0.124*		0.101	0.059		0.060	0.017
State GDP as share of national GDP		-0.032	-0.668**		-0.001	-0.160*		-0.670**	-0.152**		-0.276**	-0.033
Farm acres in very large farms share		0.487**	0.436**		0.129**	0.186**		—	—		—	—
Farm acres in corporate farms share		—	—		—	—		0.045*	0.083**		0.046**	0.044**
Farms using contract labor share		0.479**	0.273**		0.223**	0.107**		0.150**	-0.077**		0.095**	-0.038**
Farming as primary occupation share		-0.062	0.079*		0.035*	0.029*		0.016	0.044**		-0.017	-0.001
Region controls			†			†			†			†
Year controls			‡			‡			‡			‡

Panel 2: Diversity						
Variable	Index of crops by acre			Average number products per farm		
	Not adjusted	Adjusted	Region & time effects	Not adjusted	Adjusted	Region & time effects
Policy: Federal subsidy share (standard error)	1.04** (.189)	1.250** (0.164)	0.902** (0.198)	1.58	-1.599 (1.262)	-3.880** (1.263)
Covariates						
Precipitation, 3 year mean		-0.002**	0.000		0.004	-0.007
Mean temperature		0.004**	0.001		-0.039**	-0.024**
Unemployment rate		0.160	0.171		3.959**	-1.199
State GDP as share of national GDP		-1.527**	-1.478**		2.672	5.098**
Farm acres in very large farms share		0.291**	-0.103		-3.613**	-1.936**
Farms using contract labor share		-0.048	0.088		-1.161	-2.801**
Farming as primary occupation share		-0.260**	-0.009		4.360**	2.730**
Region controls			†			†
Year controls			‡			‡

Results reported utilize robust standard errors

* $p < 0.05$ ** $p < 0.01$

† Vector of dummy variables representing USDA regions 0-10, 0 as referent

‡ Year dummy variables for 1978-2007, 1978 as referent

Results reported utilize robust standard errors

* $p < 0.05$ ** $p < 0.01$

† Vector of dummy variables representing USDA regions 0-10, 0 as referent

‡ Year dummy variables for 1978-2007, 1978 as referent

Table 3. Regression analysis of federal subsidy share on U.S. farm size, ownership, and diversity measures, 1978-2007

100 percent scale built by the Tax Foundation for the corresponding year⁷⁶ and is analyzed as a comprehensive rate. The burden is the result of the sum of the collections divided by the total state income and, comprehensively, is a good proxy for the general cost of doing business, allowing for comparisons between states in terms of the relative burdens. It is important to understand the way the rate is measured in order to grasp its variability and dynamism. The tax burden changes from one year to another, as opposed to the state and local tax statutory tax rates, which remain fairly static. Exemptions, preferential treatments, different assessments, or any other adjustment in setting the tax bases also affect the tax burden.

Anticorporate farming laws: Binomial variable coding was adopted for anticorporate farming laws. If state x at year t has one of these laws, the value was indicated as 1, and otherwise the value is 0. A total of 60 observations out of 343 (17.4 percent) are coded as 1. In order to specify the existence of a law in a specific state, the authors used information from the legislation tracker for anticorporate

farming laws available at the National Agricultural Law Center, individual state statutes and codes,⁷⁷ and the Community Environmental Legal Defense Fund.

RESULTS AND POLICY IMPLICATIONS

FEDERAL FARM SUBSIDIES

Results from the analysis using federal subsidies are reported in table 3 and show generally that subsidies are negatively associated with crop diversity. The association between government payments and corporate ownership is not substantial in this model when controlling for region and time.⁷⁸ Though the relationship is not strong at the crop-production level, corporate influence should not be fully discounted. Corporations likely benefit indirectly from subsidies through cheaper prices at the processor level, and large food processors may be more likely to contract with larger farms as a matter of convenience and to promote economies of scale.

The 2002 CRS paper to Congress referenced above states that “data on state averages obscure the high

Panel 1: Ownership and Size												
Variable	Share of farm acres owned by corporations			Share of farms owned by corporations			Share of farm acres from farms with > 1,000 Acres			Share of farm acres from farms with > 2,000 acres		
	Not adjusted	Adjusted	Region & time effects	Not adjusted	Adjusted	Region & time effects	Not adjusted	Adjusted	Region & time effects	Not adjusted	Adjusted	Region & time effects
Policy: State tax burden (standard error)	0.449 (.381)	1.535** (.333)	0.830** (.293)	0.197 (.155)	0.237 (0.146)	0.140 (0.103)	-1.214** (.236)	-0.437* (.177)	-.358** (.098)	-.282** (.091)	-0.234** (0.086)	-0.066 (0.036)
Covariates												
Precipitation, 3 year mean		0.001*	0.001		0.000	0.000		-0.002**	0.000		-0.001**	0.000
Mean temperature		-0.002**	0.004**		0.000	0.002**		0.002**	0.000		0.001**	0.000
Unemployment rate		-0.064	-0.444*		-0.223**	-0.126*		0.081	0.073		0.051	0.019
State GDP as share of national GDP		-0.110	-0.705**		-0.022**	-0.180**		-0.623**	-0.109*		-0.258**	-0.025
Federal farm subsidy share		-0.164	0.166		-0.331**	0.055		0.711**	0.356**		0.213**	0.142**
Farm acres in very large farms share		0.627**	0.530**		0.146**	0.200*		—	—		—	—
Farm acres in corporate farms share		—	—		—	—		0.047*	0.084**		0.051**	0.043**
Farms using contract labor share		0.416**	0.325**		0.217**	0.111**		0.156**	-0.094**		0.096**	-0.040**
Farming as primary occupation share		-0.126**	0.024		0.029	0.023		0.023	0.054**		-0.012	0.001
Region controls			†			†			†			†
Year controls			‡			‡			‡			‡

Panel 2: Diversity						
Variable	Index of crops by acre			Average number products per farm		
	Not adjusted	Adjusted	Region & time effects	Not adjusted	Adjusted	Region & time effects
Policy: State tax burden (standard error)	-4.763** (.417)	-2.125** (0.411)	-2.020** (0.395)	29.6** (3.780)	8.844** (3.16)	9.854** (2.331)
Covariates						
Precipitation, 3 year mean		-0.002**	0.000		0.003	-0.007
Mean temperature		0.003*	0.000		-0.034**	-0.021**
Unemployment rate		0.078	0.171		4.276**	-1.968
State GDP as share of national GDP		-1.353**	-1.131**		1.907	3.890**
Federal farm subsidy share		1.062**	0.837**		-1.296	-4.077**
Farm acres in very large farms share		0.149	-0.222*		-3.047**	-1.139*
Farms using contract labor share		-0.026	-0.177		-1.408*	-2.350**
Farming as primary occupation share		-0.183**	0.057		4.139**	2.370**
Region controls			†			†
Year controls			‡			‡

Results reported utilize robust standard errors

* $p < 0.05$ ** $p < 0.01$

† Vector of dummy variables representing USDA regions 0-10, 0 as referent

‡ Year dummy variables for 1978-2007, 1978 as referent

Results reported utilize robust standard errors

* $p < 0.05$ ** $p < 0.01$

† Vector of dummy variables representing USDA regions 0-10, 0 as referent

‡ Year dummy variables for 1978-2007, 1978 as referent

Table 4. Regression analysis of state tax burden on U.S. farm size, ownership, and diversity measures, 1978-2007

concentrations of payments to a relatively small proportion of the farms receiving subsidies.⁷⁹ This fact is seen in the data presented. A regression on the large farm variables shows federal subsidies to be positive and statistically significant, which supports the idea that farm subsidies disproportionately favor large farms over small ones.⁸⁰ When controlling for region and time effects, a one percent increase in share of federal subsidies is associated with a 0.37 percentage point increase in share of farms that are 1,000 acres or larger. Such an increase is also highly significant and results in an increased coefficient of 0.15 percentage points of farms greater than 2,000 acres.

As projected, subsidy share is negatively associated with crop diversity. Federal payments to farms are concentrated by region, and the inclusion of region covariates reduces the magnitude of the effect on the index of crops by acre, though when looking at the basic measure of crops per farm the effect is more pronounced. Controlling for year and region, a one percentage point increase in the share of government payments is associated with a 0.009 increase

in the diversity index, a small but significant rise that indicates diversity reduction. The impact on crops per farm is similar in that subsidies show increased monoculture. For this measure, a one point increase in share of subsidies reduces products per farm by nearly 0.04.⁸¹

The relationship between subsidies and crop diversity does not run one way but can be seen as a feedback loop in which product concentration also requires more subsidies. While subsidies encourage production of certain types of crops, growing these crops will result in greater subsidization. Analyzing future federal subsidies as the dependent variable shows that subsidies are inversely associated with crop diversity in the previous year, as measured in the products per acre index. Given the amount of volatility in federal subsidies, further analysis of this measure will be necessary to make more concrete statements.

Government payments to farms are consistently associated with decreases to crop diversity, as measured both in the product index and the crops-per-farm figures. The policies surrounding crop subsidization in the United States

are volatile topics in policy debates. To some extent, these support mechanisms are reformed with each new Farm Bill, but at the core they are difficult to change substantially. Numerous powerful stakeholders within domestic and international realms advocate oppositional reforms, and policy effects can be difficult to tease apart in order to make objective assessments. One outcome that became clear through this analysis is that federal farm subsidies, as they are currently allocated, work against crop diversity and may promote farm practices that are environmentally unsound. A farmer that produces subsidized crops is not likely to shift output in ways that will reduce income. Additionally, new farms entering the market are likely to be influenced by the financial incentives and stability that crop subsidization offers, particularly when the primary objective is maximizing profit.

In some cases, farmers may be responsive to demand-driven market forces that show profitability for producing unsubsidized crops and for using healthy practices. In other cases, federal incentives may overshadow such drivers. One policy suggestion to increase crop diversity is to actualize payment decoupling through reduction in ad hoc subsidization. Another positive step would be to eliminate restrictions on fruit and vegetable production in order to decouple payments and to encourage policies that have minimal impact on markets. A recent USDA report projected that eliminating these restrictions would have positive effects on the production of fruit and vegetables, both working to maintain current levels while also encouraging new production.⁸² Legislation could be directed one step further to reallocate federal money from commodity crop subsidies to intentional funding of a diverse array of foods and to restructure allocation criteria to more directly benefit small and midsize farms.

STATE AND LOCAL TAX BURDEN

The policy variable indicating state tax burden is highly significant across measures of corporate ownership, size, and crop diversity (see table 4). A surprising result is that under the region and time effects specification, a higher state and local tax burden is associated positively and significantly with a higher share of acres owned by corporations. One potential explanation for this result may be that state and local tax collection could rely heavily on individuals and families rather than corporations and does not necessarily deter corporate involvement in agriculture. Another cause may be that the effect of land preferences in taxation and their presence across several states favor and encourage corporate ownership. Furthermore,

the deductibility of state and local taxes paid from federal income tax may balance out the effect of the local burden, a result that cannot be tested using the current model.

As expected, the relationship between state tax and proportion of large farms is strong and negative. Controlling for region and time, a one percentage point increase in state tax burden relates to a decrease in the proportion of farms with more than 1,000 acres by 0.0036. The coefficient remains negative but not statistically significant for the share of farms of more than 2,000 acres.⁸³ The results indicate that the state and local tax burden works as an effective obstacle to large-scale farming. The coefficient showing that a higher share of federal subsidies to agriculture promotes large-scale farming confirms results reported in the previous section.

State tax burden is statistically significant on both measures of crop diversity at 99 percent under a specification that includes region and time effects. As expected, the relationship between tax burden and crop diversity is a positive one, so that higher state and local taxes result in greater diversity. Controlling for region and year, a one percentage point increase in state tax burden is associated with a .10 increase in the number of products per farm, and a reduction on the crop-diversity index of 0.02 (indicating increased diversity). A causal relationship between tax burden and crop diversity is likely to be seen through a modifying variable or set of variables. In this case, it is likely that farm size, rather than type of ownership, is acting as a modifier. The variable representing farm acres in very large farms (2,000-plus acres) shows a negative relationship on products per farm, indicating that larger farms are less diverse.

This analysis provides a relative indicator of the intra-farm decisionmaking process based on inputs. Tax burden seems to work effectively as a deterrent of extensive agriculture and indicates a possible path through which diversity may be achieved. Alternative explanations supporting the results could be further explored by analyzing the impact on different factors of production like machinery and labor prevalence.

The first policy observation that emerges is that tax breaks and preferential treatments are neither the only nor the most efficient way to attract investment and resources to agriculture. As those differential interventions are often accompanied by distortions based on size or sales, the final outcomes are not only regressive in that they favor

Table 5. Regression analysis of anticorporate farm laws on U.S. farm size, ownership, and diversity measures, 1978-2007

Panel 1: Ownership and size	Share of farm acres owned by corporations			Share of farms owned by corporations			Share of farm acres from farms with > 1,000 acres			Share of farm acres from farms with > 2,000 acres		
	Not adjusted	Adjusted	Region & time effects	Not adjusted	Adjusted	Region & time effects	Not adjusted	Adjusted	Region & time effects	Not adjusted	Adjusted	Region & time effects
Policy: Anticorporate farm law	-.019	-0.009	-0.005	-.009*	0.002	0.004	.031**	-0.013*	-0.007*	0.004	-0.008**	-0.005**
(standard error)	(.010)	(.010)	(.008)	(.004)	(0.004)	(0.003)	(.007)	(.005)	(.003)	(.003)	(0.002)	(0.001)
Covariates												
Precipitation, 3 year mean		0.001	0.001		0.000	0.000		-0.003**	0.000		-0.001**	0.000
Mean temperature		-0.002**	0.005**		0.000	0.002**		0.002**	0.000		0.001**	0.000
Unemployment rate		-0.173	-0.403*		-0.235**	-0.112		0.087	0.041		0.051	-0.002
State GDP as share of national GDP		-0.066	-0.701**		0.003	-0.145**		-0.689**	-0.178**		-0.286**	-0.060**
Federal farm subsidy share		-0.325*	0.127		-0.353**	0.052		0.796**	0.368**		0.267**	0.140**
Farm acres in very large farms share		0.485**	0.443**		0.129**	0.181**		—	—		—	—
Farm acres in corporate farms share		—	—		—	—		0.042*	0.082**		0.042**	0.040**
Farms using contract labor share		0.470**	0.274**		0.224**	0.117**		0.141**	-0.074**		0.090**	-0.031**
Farming as primary occupation share		-0.048	0.087*		0.034*	0.023		0.023	0.049**		-0.011	0.006
Region controls			†			†			†			†
Year controls			‡			‡			‡			‡
Panel 2: Diversity	Index of crops by acre			Average number products per farm								
	Not adjusted	Adjusted	Region & time effects	Not adjusted	Adjusted	Region & time effects						
Policy: Anticorporate farm law	0.018	-0.025*	-0.029**	.627**	0.231*	0.168*						
(standard error)	(.013)	(0.012)	(0.011)	(.111)	(0.090)	(0.070)						
Covariates												
Precipitation, 3 year mean		-0.002**	0.000		0.004	-0.007						
Mean temperature		0.004**	0.000		-0.038**	-0.026						
Unemployment rate		0.128	0.104		4.178**	-0.766						
State GDP as share of national GDP		-1.590**	-1.616**		3.376*	5.837						
Federal farm subsidy share		1.414**	0.980**		-3.084*	-4.199						
Farm acres in very large farms share		0.290**	-0.131		-3.556**	-2.096						
Farms using contract labor share		-0.071	0.117		-1.079	-2.747						
Farming as primary occupation share		-0.239**	0.036		4.191**	2.504						
Region controls			†			†						
Year controls			‡			‡						

Results reported utilize robust standard errors

* $p < 0.05$ ** $p < 0.01$

† Vector of dummy variables representing USDA regions 0-10, 0 as referent

‡ Year dummy variables for 1978-2007, 1978 as referent

Table 5. Regression analysis of anticorporate farm laws on U.S. farm size, ownership, and diversity measures, 1978-2007

disproportionately large farms, but they also inhibit crop diversity and therefore prevent positive environmental and health spillovers. State and local taxes are effective mechanisms for controlling extensive agriculture and, consequently, have the potential to prevent intensive uses of land that can lead to degradation. A regime that taxes all inputs and activities evenly makes it harder to rely on capital-intensive and/or land-intensive agriculture and through barriers may promote sustainability. Finally, by establishing benefit ceilings, state and local governments may ensure engagement in agriculture while simultaneously addressing small farming interests and limiting the attractiveness of large-scale unsustainable agriculture.

ANTICORPORATE FARM LAWS

Despite the existence of anticorporate farm laws (ACLs), states with these laws show similar trends in corporate ownership of farm acres as those that do not have such laws. The numbers show that states with anticorporate farm laws had a relatively smaller share of corporate owned farm acres at the beginning of the period of analysis (1978) than those without such laws, 7.8 percent and

12.6 percent respectively. The corporate share of farm acres increased slightly for both types of states in parallel ways. However, in anticorporate-farm-law states, the share grew at a greater rate than states without such statutes (see figure 3).

From 1978 to 2007, corporate ownership of farm acres increased by 64 percent in anticorporate-farm-law states compared with an increase of only 25 percent for states without these laws. A comparison of data points between 1982 and 1997, which allows for all nine anticorporate farm states to be evaluated together against the remaining 41 states, shows a percent change increase in corporate owned acres of 28.4 percent (ACL) to 25.7 percent (non-ACL). Even with these figures it is notable that rates of change are not slowed by the presence of anticorporate farm laws, though ultimately, corporate farms are less present in states with anticorporate farm laws.

Examination of the anticorporate farm laws in regressions on key ownership variables shows little significance.

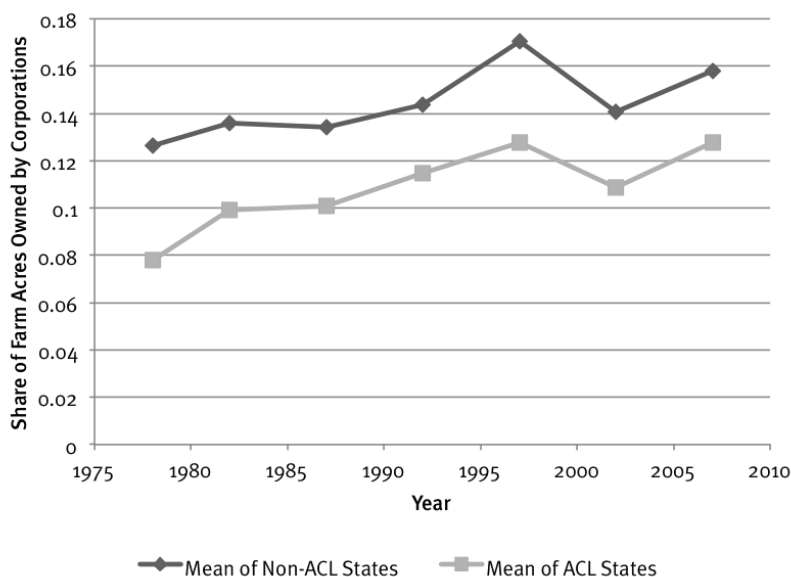


Figure 3. Corporate Farm Ownership Prevalence in States With and Without Anticorporate Farm Laws

See table 5 for ACL regression results. The laws show no significant association with corporate ownership measured by farms or by acres when controlling for region and time effects.⁸⁴ One possible explanation could be the presence of corporate exemptions in the statutes discussed above. Though anticorporate farming laws do not appear to be very effective in relation to ownership variables, they have a significant effect on farm size, as the causal model predicts. Anticorporate farming laws decreased share of farms larger than 1,000 acres by 0.007, and share of farms with more than 2,000 acres by 0.005. This is an important effect, given that large farms tend to practice the least sustainable agriculture.

Though anticorporate farm laws do not appear important in relation to corporate ownership, they do show significant results in relation to crop diversity, as indicated in regressions on the index of crops by acre and the average number of products per farm. A simple comparison of products per farm for ACL versus non-ACL observations shows that those with corporate restrictions average 3.4 products while those without average 2.8 products.⁸⁵ When controlling for regional and time effects, the presence of an anticorporate farm law is associated with an increase of 0.168 products per farm. The coefficient on the laws is significant at 95 percent and appears practically significant as well, given that the mean number of products per farm for this data set is 2.9. This analysis includes a control for share of federal

subsidies, lending further credibility to this finding, since farm subsidies persistently show a negative relationship with crop diversity. Furthermore, the regions in which ACLs are found are two of the top regions to receive subsidies.

The results for the diversity index of crops by acre are highly significant and support the research model. In states with anticorporate farming laws, the diversity index decreases by 0.029, trending toward more crop diversity. The coefficient on share of farm subsidies is similarly highly significant, further strengthening inferences from the products per farm analysis.

While ACLs have been ineffective in slowing corporatization of agriculture, they have significantly affected farm size and crop diversity, as predicted by the model. The authors hypothesize that the very form of the exemptions on corporate ownership in these states—conditions of blood relationship, limitations on number of shareholders, legal restrictions on type of corporation, and more—may account for these complex findings. Corporatization occurs, but in an almost nominal way when such conditions are taken into account. In certain ways, ACLs restrict farms from becoming excessively large, through restrictions on blood and the number of owners of the farm. Although ACLs do not deter corporate presence, they seem to work as a mechanism that controls extensive large-scale agriculture and attenuates certain kinds of corporate practices and, by extension, promotes crop diversity and sustainability.

Final Causal Model

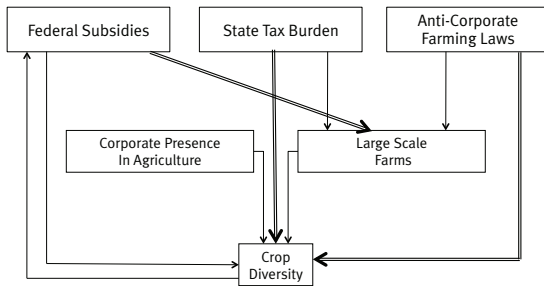


Figure 4. Actual Causal Model as Determined by Analyses

In order to reduce corporate presence in agriculture, exemptions should be revised and loopholes closed in the ACLs. The breadth of exclusions listed in the statutes render ACLs all but ineffective in restricting corporate farming, as can be seen by the more rapid rate of corporate growth in these states. Further, limits to farm size can be legislated in order to accomplish many of the objectives of these laws.

The hypothesized causal model may now be altered to reflect results of the preceding analyses. Figure 4 is an actual causal model based on these results, depicting a revised diagram of significant relationships between policy, farm characteristics, and outcomes. One key difference between the hypothesized and actual causal models is that federal subsidies are not significantly associated with corporate presence. Another change shown is that a relationship exists between ACLs and crop diversity that circumvents farm size and structure.

LIMITATIONS OF THE ANALYSIS

There are a number of primary limitations on the current analysis. First, the nature of the federal subsidies makes it difficult to establish a causal statement, and consequently a threat of possible reverse causality remains untested. Possible solutions may include adjusting with a lagged value of the subsidies indicator or including an instrumental variable.⁸⁶ Also, comparisons between states that establish anticorporate farming laws and those that do not may not provide a proper balance since the number of state-year combinations differs substantially and means at baseline are different. The analysis presented in this report refers to variables measured in either percentages or indices, though a different analysis could examine the

effect of specific policies in the changes in ownership structures and crop diversity.

Although every effort was made to ensure comparability across all the years, different reporting issues, including but not limited to data aggregation, may still impose limits on running comprehensive models that fully capture the three decades analyzed in this study. For example, the exact contribution of the very small farms—less than 10 acres in size—may be underreported before 2002, thus influencing both the ownership structures and the diversity indices. Data aggregation on the sales data for the later years considerably limits the ability to build detailed distributional indices.

FUTURE RESEARCH

The present analysis considers the ways in which certain state and federal policies affect the supply of agricultural products. There are reasons to believe that demand-driven interventions and policies are very likely to affect diversity at the farm level. Conscious consumers, interest in organic agriculture, and the slow-food movement are no longer isolated efforts and are beginning to influence specific policies. Initiatives like Know Your Farmer, farm-to-school programs, and the emergence and consolidation of alternative food networks and farmers' markets may influence farming practices and policy. The USDA is beginning to collect data on these initiatives, and a relevant analysis of the impact of demand-driven forces on crop diversity could provide valuable insights.

Relatively recent adjustments to the Farm Bill structure and guidelines for subsidy allocation are not fully captured here and merit deeper analysis. Additionally, the differences in crop diversity and average farm size observed across counties within a state suggest that some detailed studies within a state that focus on local policies might provide a useful perspective that is not fully captured in the current analysis given the lack of available information on local policies.

A final line of research focusing on the usefulness of crop-diversity indices could analyze their rel-

evance for understanding the environmental consequences of specific agricultural arrangements, either on farm size or ownership structure. The indices could be applied to analyses of soil degradation, water pollution, or other environmental externalities. A similar approach could be helpful for linking food availability and food distribution at the state and local level, based on the supply characteristics that the diversity analysis in the present paper attempts to provide.

DISCUSSION

Crop diversity in the U.S. has shown significant decreases in the past 30 years. This loss may be viewed as one consequence of increased industrialization in agriculture and increased uptake of monocropping practices that are enabled and favored by industrial farming methods. As a proxy for sustainability, diverse cropping patterns indicate agricultural practices are trending toward more harm. The results from this analysis show the impact of three policies on crop diversity, both directly and as attenuated through farm size and ownership structure. These findings indicate that federal farm subsidies have a detrimental effect on diversity, while higher state tax burdens and state anticorporate farm laws both encourage sustainable practices.

Policies do not occur in isolation. Examination of all three policies together shows only slight shifts in the magnitude of effects but underscores a tension between policies at

different levels of government. While state and local initiatives may work as a vehicle for promoting crop diversity and sustainability, federal policies can offset state efforts. Pre-emption, the notion that preference is given to regulation at higher levels of government, may play a role in the supremacy of federal regulation over state and local laws. The results presented here raise fundamental questions about the role and nature of federal interventions in agriculture. Should the federal government have a primary role in the farming structure and output of the most important agricultural states, and if so, does it establish the proper mechanisms through which the affected states raise their concerns and intentions?

Ideally, agricultural policies should be coordinated across different governmental tiers, which would allow for interactions with related policy concerns, such as nutrition-based health outcomes and environment. Since local control over policy tends to promote environmental protections, unduly influential federal policies favoring business may inhibit ecological initiatives, thus exacerbating the negative spillovers embedded in large-scale monoculture practices. This analysis shows that federal subsidies are strongly associated with decreased crop diversity, but that state regulations can influence these results. If the federal government is unwilling to pursue strong environmental policies associated with agriculture, farm policy devolution may be one key solution in bringing agricultural practice into alignment with environmental sustainability.

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- 75 A model using state fixed effects would also disentangle within region state differences, but the efficiency cost and the reduction in the degrees of freedom must also be taken into consideration. Given that USDA regional groupings are based on agricultural, geographic, and ecologic factors, we believe these offer reasonable boundaries for control while allowing for some additional variation. Alternative results using the state and time fixed effects specification are available upon request.
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LONG SHADOWS: MEANING-MAKING AMID DUELING NARRATIVES OF THE FINANCIAL CRISIS

DAVID COLBY REED

ABSTRACT Much ink has been spilled in discussion of the financial crisis of 2007-2009, but there have been few compelling causal accounts of the crisis advanced in the public sphere. Instead, there has been a profusion of financial crisis narratives that have sought to explain the crisis as the exclusive fault of one party or another. If blame assignment drives the causal narratives of the crisis, the resulting policy prescriptions are more likely to treat the symptoms of the crisis rather than its causes. Thus, communication of the crisis's origins is imperative. This review assesses three prominent blame-based causal narratives of the crisis. Faulting those narratives for explanatory inadequacy, I advance an alternate narrative of the financial crisis as a panic in the shadow banking system.

INTRODUCTION: MAKING MEANING AND RED HERRINGS

The financial crisis of 2007-2009 and the great recession that ensued realigned economic policy around energetic intervention. For dyed-in-the-wool progressives and stalwart evangelists of laissez-faire alike, the collapse of commercial credit and stock markets was an unmitigated social ill that required robust countermeasures. Throughout 2008, free-market Republicans Secretary of the Treasury Hank Paulson, Federal Reserve Chairman Ben Bernanke, and President George W. Bush initiated an unprecedented intervention of the federal government and central bank in the financial system of the United States. The Secretary of the Treasury, described by contemporary accounts as a “reluctant socialist,”¹ relied on the support of congressional Democrats to secure passage of the Emergency Economic Stabilization Act of 2008, progenitor of the ill-famed TARP. Through expanded lending facilities and quantitative easing—the purchase of corporate debt, such as credit card receivables, auto loans, and commercial real estate—the Federal Reserve stanching the hemorrhage of massive corporate losses. The president, in a prime-time address, affirmed that he is “a strong believer in free enterprise,” yet advanced his proposal to “put up to \$700 billion of taxpayer dollars on the line to purchase troubled assets that are clogging the financial system.”²

Today, the immediate ravages of the financial crisis have been contained. Modest economic recovery has taken root in the United States, and the prospect of a wave of bankruptcies and even higher levels of unemployment has receded in the minds of policymakers. Curiously, amid tentative recovery and contentious debate on financial-reform legislation, there are few comprehensive accounts of the financial crisis in the public sphere. Instead, the dominant memes are alike only in their emphasis on assigning blame for the crisis. The present focus on blame attribution advances causal narratives of the crisis that militate in favor of unsatisfactory policy interventions. By advancing blame-based causal narratives, policymakers risk treating the symptoms of the crisis rather than addressing its root causes.

Bereft of a coherent, comprehensive origin story of the financial crisis, policymakers and the public are now grappling with a second, epistemic crisis: how to avert another such crisis in a world in which fundamental theories of finance lack predictive validity. Because the underlying institutions that enabled the financial crisis remain in

place, the stakes of the epistemic crisis are high. This paper is a treatment of the foremost causal narratives that have been used to explain the financial crisis and, by extension, justify the particular courses of policy action pursued by the narratives’ proponents. I conclude by advancing an alternative causal narrative for the financial crisis in order to highlight policy questions crowded out by blame assignment.

PART I: FINANCIAL CRISIS AS EPISTEMIC CRISIS

Waxman: You found a flaw?

Greenspan: I found a flaw in the model that I perceived is the critical functioning structure that defines how the world works, so to speak.

Waxman: In other words, you found that your view of the world, your ideology, was not right. It was not working.

Greenspan: Precisely. That’s precisely the reason I was shocked, because I had been going for 40 years or more with very considerable evidence that it was working exceptionally well.

— Henry Waxman and Alan Greenspan, *during Greenspan’s testimony to the House Committee on Oversight and Government Reform at a hearing on the role of federal regulators in the financial crisis, October 23, 2008*³

Arjen Boin and colleagues write that a crisis can be regarded as a “transitional phase during which the normal ways of operating no longer work.”⁴ This definition is somewhat misleading, inasmuch as it implies that the effects of the crisis are localized within the transitional phase exclusively. The reality is more fraught: even after the immediate, operational elements of a crisis have been mitigated, the crisis’s enabling conditions remain largely intact. Sound crisis management, then, requires that these precrisis conditions be addressed.

However, addressing precrisis conditions requires that there be a broadly held agreement on how the crisis unfolded. Such a consensus view is missing from the current debate, and in what Boin and colleagues might call an “incomprehensible,” “long shadow crisis,” there is an increasingly heated public contest over the shape of a causal narrative for the financial crisis.

Proponents of the various causal narratives at play recognize that the stakes of problem definition are high.

“

But causal narratives do more than explain, ex post, a crisis; importantly, they shape options concerning future reforms.

Narrative frames have long been used to make sense of a problem and make multiple policy positions cohere as a bundled package. Policies are often complex, and an effective narrative will define the problem in such a way as to make the implementation of the favored policies an inescapably sound conclusion. Boin and colleagues define the formation of such causal narratives as “meaning-making” and argue the case for the special significance of meaning-making in a postcrisis scenario. They assert that crisis communication is key to securing the “permissive consensus” of the governed that leaders need in order to shape postcrisis learning and reform.

The contest over meaning-making and causal narratives is ordinarily intense, but it is all the more important following the financial crisis of 2007-2009. This financial crisis resulted in the destruction of prodigious amounts of wealth, but an unexpected victim was a neoliberal economic view that had risen to international prominence over the preceding half-century: the rational-market theory and its efficient-markets hypothesis. Rational-market theory has been the intellectual underpinning of countless business decisions and government policies, and has informed the backbone of entire generations’ academic training. The crisis was a strong refutation of rational-market theory, and it required deep revisions to the worldviews of policymakers and businesspeople. Consequently, meaning-making for the financial crisis is not simply a tool of policy promotion; instead, it is essential to an active search for certainty in economic theory and all its derivative applications. Thus, the financial crisis is also a crisis of political epistemology.

To understand the nature of the dual meaning of the financial crisis and its influence on causal narratives, it is necessary to understand the vacuum created by the fall of rational-market theory. The theory has a long and fascinating history, but pertinently, it posits that as more financial instruments are created and traded, they will

inevitably bring more rationality to economic activity. The belief has many intellectual contributors, but arguably the most prominent were Friedrich Hayek, Milton Friedman, George Stigler, and Eugene Fama. Hayek offered the premise that the information required to make an economy run “never exists in a concentrated or integrated form, but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess.”⁵

Prices were the mechanism by which Hayek’s disaggregated actors communicated their special knowledge, and financial and commodities markets were forums for the collection and communication of prices. Given sufficiently high numbers of traders and trading volumes, the market should always offer the best estimate of the intrinsic values of the items being traded. Because market participants are profit-seeking, they will take advantage of any new information and, through competition, erase the profitable nature of that information. In so doing, they constantly drive the market price back to the best possible estimate of value. Fluctuation around a market price, then, is just random noise. According to Fama, “in an efficient market, the actions of the many competing participants should cause the actual price of the security to wander randomly about its intrinsic value.”⁶ If stock-market prices are random, they cannot be predicted on the basis of past movements. As the volume and velocity of trades increased, so did the credence of a second notion of stock prices: that they are impossible to predict based on publicly available information. As these ideas gained in popularity, they came to drive government decisionmaking and private investment decisions.

The exchange between Henry Waxman and Alan Greenspan reprinted above captures the extent of the influence of rational-market theory in both its ascent and decline. The shadow of rational-market theory hangs over the present contest over causal narratives of the financial crisis as well. Boin et al. describe the difficulty of postcrisis reform as arising from tensions between “reformist” and “conservative” approaches to crisis management. Reformists attempt deep changes to precrisis institutions, whereas proponents of the conservative approach advocate gradual change to these institutions and defend their fundamental social value. The two approaches to postcrisis reform find voice in causal narratives that seek to either thoroughly reject rational-market theory or offer qualified restatements of the theory. The approaches are distinguished by the parties on which they foist blame.

PART II: THE BLAME GAME

There has been a profusion of blame-based explanations for the financial crisis, and it is not the place of this paper to review them all. Instead, I identify three prominent examples of blame-based narratives:

1. “Greedy Wall Street bankers duped consumers for personal gain.”
2. “Feckless regulators pushed for deregulation and were too incompetent to do their jobs.”
3. “Consumers bought more house than they could afford, either through ignorance or fraud.”

I review briefly the components of each narrative in turn.

WALL STREET: GREED IS GOOD; ORIGINATE-TO-DISTRIBUTE

To advance the financial-regulation legislation in the Senate and overcome Republican filibusters, Democrats described the legislation as “a Wall Street reform bill,” and this sobriquet captures the crux of the “evil bankers” narrative. In this construction, greedy bankers created predatory subprime mortgages that they quickly sold to other, unsuspecting investors through securitization. Because bankers originated loans that they did not intend to keep on their balance sheets, they applied loose lending criteria to prospective borrowers and failed to exercise due diligence. Moreover, bankers used leverage to take risky bets that would line their pockets if the bets paid off. Should the bets fail, losses would accrue to disparate shareholders and, ultimately, taxpayers.

This view is not without merit. Because of compensation structures that rewarded traders for short-term gains and provided incentive for the creation and sale of opaque financial products as risk-management tools, bankers indeed reaped private profits even as they socialized risk. Moreover, bank critics like Elizabeth Warren note that consumers are routinely unable to understand many mortgage-related terms as presented in contracts and cite repeated instances of borrowers who qualified for prime loans but were sold subprime loans that proved more lucrative for originators.⁷ But the narrative fails to explain why banks themselves should have kept so many poorly performing assets on their balance sheets. Worse, the recommendations that flow from this narrative fail to address the shadow banking system (described in Part III). By focusing attentions of executive and trader pay, the “evil bankers” narrative also supports daily mark-to-

market accounting rules, which work well in ordinary times but depress prices and promote insolvency in times of investor panic.

THE REGULATORS: THE MAESTRO IS TONE-DEAF

Other parties fault the regulators who kept interest rates low and the officials who supported deregulation of the financial sector. They point to the Gramm-Leach-Bliley Act of 1999 (which repealed the Glass-Steagall Act of 1933, the law that forced the separation of commercial deposit-taking and investment banking) and argue that low target federal funds rates set by the Federal Reserve Bank’s Open Market Committee inflated house prices by making other assets less desirable investments. The Fed is also faulted for failing to “stem the flow of toxic mortgages” through better regulation of mortgage-lending standards.⁸

Again, this view identifies only part of the problem. It is true that following the repeal of the Glass-Steagall Act, deposit-taking banks like Bank of America and Citigroup leveraged publicly insured customer deposits in order to trade on their own accounts and thereby use a subsidy for speculative investments. But large multiservice banks did not suffer the sorts of losses incurred by Lehman Brothers, Bear Sterns, Merrill Lynch, Morgan Stanley, and Goldman Sachs.⁹ Investment banks and broker dealers were not regulated under New Deal-era rules and thus did not benefit from their repeal.

Similarly, low interest rates were partly a function of regulators’ decisions, but they were also a product of high global demand for U.S. Treasuries following the Asian financial crisis of the 1990s. Sovereign investors sought foreign reserves to insure against currency runs, and explosive growth in export-oriented countries like China continued to increase demand for dollars, thereby driving down interest rates and, with them, credit spreads across a variety of asset classes.

This narrative favors stricter rules for banks and their regulators to minimize the risks of lax oversight and regulatory capture.^{10,11} Strict rules bind regulators and make them less capable of responding to changes in financial markets. While the current regulatory patchwork failed to preempt the financial crisis, there are not laws on the books that empower regulators to regulate most of the actions taken by the nonbanks that precipitated the crisis.

A second, less widespread view of policy ineptitude suggests that the federal housing policy meant to promote

homeownership resulted in a flood of low-quality, high-risk loans that later failed in large numbers. This narrative is supported by the poor performance of subprime loans in the run-up to the crisis, and it favors curtailment of federal efforts to boost homeownership. But this view, too, fails to account for how underperforming subprime mortgages are related to the broader financial crisis.

CONSUMERS: GULLIBLE, FRAUDSTERS, OR BOTH

The final blame-based narrative faults homebuyers for failing to be more discriminating customers of mortgages and for “buying more house than they could afford.” Proponents often cite the popularity of NINJA (“no income, no job, and no assets”) loans to argue that buyer avarice, speculation, and gullibility are to blame for the subprime meltdown and resultant crisis.

Doubtless, mortgage fraud was a nontrivial factor in the wave of defaults, and it implicates borrowers and creditors alike. However, it fails to explain the contagion effect of mortgage defaults on a variety of asset classes, and politically, it imperils efforts to promote mortgage modifications to reduce foreclosure and shore up bank finances. By directing the lion’s share of legislative effort to consumer protection and fraud detection, it both discounts and distracts attention from the structural forces (such as the contemporary realities of corporate finance and the function of the shadow banking system) that propagated distress across asset classes more sound than subprime-mortgage bonds.

PART III: AN ALTERNATE HYPOTHESIS

As the evidence offered in Part II suggests, there is a substantial measure of truth to each of the foregoing blame-based causal narratives. The problem with blame-based causal narratives is not that they are individually inaccurate; rather they are detrimental to sound policy formation when they are considered jointly. The appeal of the blame-based narrative is its simplicity: it localizes all fault within a given party. By creating clear-cut villains and victims, blame-based narratives are ultimately too spare to contain a comprehensive causal account. If greedy bankers preyed on a gullible public, how can speculative consumers be blamed for the mortgage meltdown? If the Federal Reserve’s Open Markets Committee kept interest rates too low for too long, how can we fault bankers for seeking higher returns elsewhere?

Blame-based causal narratives of the financial crisis are mutually exclusive, and collectively they fail the test of epistemic completeness.

More damning is the effect blame-based causal narratives exert on the deliberation over postcrisis policy revisions. Because blame-based causal narratives have clear villains and victims, their recommendations are straightforward. And because these narratives are emotional, they recruit passionate partisans who are unwilling to revisit their preferred causal accounts of the crisis. The zero-sum prescriptions and uncompromising advocates associated with blame-based causal narratives combine to effectively crowd out policy recommendations that target root causes. In this section, I outline a more ecumenical causal narrative of the financial crisis: that it was, in essence, a bank panic in the shadow banking system. Viewing the financial crisis as a bank panic opens up additional lines of policy reform that are omitted from narrower, blame-based causal narratives. Finally, understanding the peculiar nature of the recent panic helps to explain the dearth of positive, rather than blame-based, narratives of the financial crisis.

WHAT IS BANKING?

The familiar role of banking is the transformation of savings in one part of an economy to investment in another part of the economy. Thus, one customer’s checking account (i.e., a demand deposit) might be used to extend a loan to another customer. Banks serve a second, less obvious function in creating additional media of exchange. These new media of exchange take the form of bonds of various terms of maturity. Such bonds are, in effect, private money, and they are endemic to a capitalist system of exchange.¹²

The most common form of these bonds is repo, or “sale and repurchase agreements,” and it is used for short-term savings by large institutional investors and companies. Repo functions like a checking account for institutions.¹³ In the case of a consumer checking account, the customer opens an account by loaning funds to the bank. In exchange, the bank pays the customer some interest rate i , and makes loans to other borrowers at some higher interest rate, l . There is no collateral exchanged because individuals’ deposits are insured by the federal government. (Currently, federal deposit insurance is \$250,000 per individual per account.) Because a customer can withdraw her funds at any time, the bank effectively uses short-term debt to finance long-term investments.

Bond Class ²³	July '07 (Preccrisis)	Late July-Aug.	Q3 2007	Q4 2007	Q1 2008	Q2 2008	Q2 2008 - 9/15/08
Corporate A-AA rated	0%	0%	0%	0%	0%	0%	0%
Corporate BBB rated	0%	0%	0%	0%	0%	0-5%	0-5%
Corporate < BBB- rated	0%	0%	0%	0%	0%	0-5%	0-5%
ABS AA-AA	0%	2-5%	3-7%	5-10%	10-15%	15-20%	20-25%
ABS BBB-AA	0%	3-7%	5-10%	10-15%	15-20%	20-25%	20-30%+
ABS < BBB	0-2%	5-10%	10-15%	15-20%	20-25%	100%	100%
CLO, Other AA-AAA	0%	2-5%	3-7%	5-10%	10-15%	15-20%	15-25%
CLO, Other BBB-AA	0%	3-7%	5-10%	10-15%	15-20%	20-25%	20-30%
CLO, Other < BBB	0-2%	5-10%	10-15%	15-20%	20-25%	100%	100%
CMO, Other AA-AAA	0%	3-7%	4-8%	5-10%+	15-20%	20-25%	20-30%+
CMO, Other BBB-AA	0%	5-10%	5-10%+	15-20%	20-25%	20-25%	100%
CMO, Other < BBB	0-2%	5-10%	10-20%	20-25%	100%	100%	100%
CDO AA-AAA	0%	3-7%	5-10%	10-20%	15-20%	15-20%	15-20%
CDO BBB-AA	0%	5-10%	10-15%	15-25%	20-30%	25-30%	100%
CDO < BBB	0-2%	10%+	15-20%	25-30%	100%	100%	100%
AVERAGE HAIRCUT	0%	5%	8%	12%	26%	38%	51%

Table 1: A Run on Repo

Haircuts on collateral indicate the withdrawal of depositors' funds in the repo market. Bond classes with a 100 percent haircut are not tradable in the repo market; their values have fallen to \$0. Haircut ranges are for average terms of one to three months for interdealer or investment-grade major market participants. All haircuts are approximations and vary by specific counterparty. In calculating mean haircut values in the final row, each asset class is weighted equally and, where haircuts appear as ranges, the midpoints of the ranges have been used (adapted from Gorton).

Similarly, if a company has cash on hand and would like to earn interest, it can lend the money to a bank or other institution in exchange for collateral. Here, the exchange of collateral for cash is necessary, because the overnight "deposit" amounts are typically many millions of dollars, and there is no corporate equivalent of the FDIC's insurance fund for consumers. The quality of collateral offered is significant, because when collateral valued at the dollar value of the repo "deposit" is offered in exchange for that deposit, the market enjoys broad liquidity and holders of collateral can use that collateral in other transactions. Thus, collateral functions as currency. In order to serve large-scale depositors, then, the banking system requires high-quality collateral.

LONG SHADOWS: THE RISE OF THE SHADOW BANKING SYSTEM

High-quality collateral has uses distinct from the repo market; it is used by firms to take derivative positions and clear financial transactions, and private and sovereign demand for high-value collateral for investment purposes is strong.¹⁴ Treasury bonds and U.S. government agency debt are the highest-value collateral (because they are backed by the federal government), though highly rated corporate debt is also valuable collateral. Given the importance of high-quality collateral, it is important to address those factors that give rise to collateral of the high-quality sort.

Over the years, Gorton has made a compelling case that the defining attribute of high-quality collateral is its information insensitivity.^{15,16,17} If the value of a bond is perceived to be information-insensitive, no bond investor has incentive to find material information about that bond that gives him advantages in a transaction concerning that bond. Consider the case of U.S. Treasuries: a short-term buyer of Treasuries does not need to examine the long-run debt projections of the United States. The yield of the bond is equivalent to its coupon value, and the market price equals its face value plus yield because other buyers and sellers are dealing in a security with a known future value. Thus, information-insensitive bonds provide liquidity to a debt market because no party has an incentive to exploit information asymmetries for arbitrage purposes. High liquidity is what makes investment in the repo market appealing to large-scale investors, and it enables borrowers to finance their short-term obligations.

The shadow banking system arose as a mechanism for creating high-quality, information-insensitive (and thereby information-symmetric) collateral to supply to repo and other markets. It did so through securitization, a financing vehicle wherein certain of a firm's assets are purchased by another legal entity of the firm. Special-Purpose Vehicles (SPVs) are the legal entities that agglomerate assets (like mortgages) and pool the cash flows from those assets. Essentially, the SPV creates a pool of money from securi-

Blame Narrative	Preferred Policy	Policy Cost/Shortcoming
Banking Deregulation/ Regulatory Laxity	Automatic rules: <ul style="list-style-type: none"> • Return to Glass-Steagall • Tight capital ratios • Size restrictions for banks 	<ul style="list-style-type: none"> • Regulation grows static while the private sector remains dynamic; regulated entities will outpace regulators as their discretion is constrained
Bankers' Greed & Predation	<ul style="list-style-type: none"> • Executive-pay restrictions • Consumer Financial Products Safety Commission • Mark-to-market accounting rules 	<ul style="list-style-type: none"> • Ignores the shadow banking system • Mark-to-market rules work well in ordinary times, but artificially depress balance sheets in a bank panic
Homebuyers' Ignorance and Fraud	<ul style="list-style-type: none"> • Consumer Financial Products Safety Commission 	<ul style="list-style-type: none"> • Undermines political efforts to stem losses from underwater mortgages • Hinders reform of Fannie and Freddie

Table 2: Blame Narratives and Associated Policy Preferences
Here, each blame-based causal narrative is related to its associated policies. Each narrative intimates a role for useful policies, but none addresses the root causes of the bank panic.

tized cash flows and then sells shares of that pool to investors in the form of bonds. The most abundant source of assets for securitization were home mortgages, as they promised long-term cash flows that could be pooled via a somewhat straightforward assessment of default risk. Bonds created by pools of mortgages are called Residential Mortgage-Backed Securities (RMBS), and they grew to become an enormous source of collateral.

Shadow banks and their structured products thus (1) serve as a financing mechanism for firms engaged in the repo market, and (2) create collateral used for clearing and settling derivatives and less exotic transactions. The collateral created by shadow banks (i.e., bonds based on pooled cash flows) is high-quality because it is information-insensitive; based on the level of their seniority and the rating of the pool of cash flows, securitized bondholders enjoy a liquid market for their bonds, provided that there is no incentive for counterparties to pursue arbitrage based on asymmetric information.

The foregoing model explains the shadow banking system through 2006. When the information insensitivity of securitized collateral was called into question by subprime-mortgage defaults, the result was the financing-market collapse that began in 2007. I treat briefly the subprime meltdown to explain the relationship between homebuyers and panic in the shadow banking system.

SUBPRIME MORTGAGES LINK WALL STREET AND MAIN STREET

Subprime mortgages are securities that were initially developed by lenders as a means of extending mortgage

loans to risky borrowers. To do so, subprime mortgages were designed with the expectation of homeowner refinancing in mind. The general idea was that both borrower and lender could benefit from constant house price appreciation over short time horizons,¹⁸ however imprudent it proved to be. Most subprime mortgages were adjustable-rate mortgages (ARMs) that combined fixed and variable interest rates in a single security. In the initial period of an ARM term (typically the first two or three years of a 30-year term), the interest rate on the loan remains fixed at a moderate level. After this initial period ends, the loan resets to a higher, variable rate, typically LIBOR¹⁹ plus some four percent to seven percent. At this point, the homeowner has a powerful incentive to refinance her loan, either with another subprime loan or, if her equity and consumer-credit positions have improved, a prime, fixed-rate mortgage.

As long as house prices continue to rise, refinancing subprime mortgages is relatively straightforward, and the securitized products created with subprime mortgages remain information-insensitive. These bonds formed the collateral used to secure borrowing and lending in the repo market, and given their information-insensitive nature, the market was liquid and collateral traded at face value. This system is threatened when house prices fall or, indeed, rise more slowly than projected by issuers of subprime mortgages. A homeowner has a considerably depressed incentive to refinance his home if he stands to lose the equity stake he established in the first two or three years of his subprime mortgage, yet he faces the threat of dramatically higher interest rates on his mortgage if he does not. A lender is less willing to finance a sec-

ond mortgage if the borrower has negative equity in the home, as that borrower's risk of default is higher. Because subprime-loan repayment almost uniformly requires refinancing, a subprime borrower's ability to repay his loan is highly sensitive to the market price of his home at the conclusion of the fixed-rate period of his mortgage. The fall of house prices in 2006–2007 severely limited homeowners' ability to refinance, and resulted in uncertainty in the cash flows that backed the RMBSs that served as collateral in a wide variety of transactions.

BRINGING IT ALL TOGETHER: THE FINANCIAL CRISIS AS A BANK PANIC

In light of the discussion of subprime mortgages and the collateral they created, it is possible to construct a narrative of the financial crisis as a bank panic. In a bank panic, a bank's creditors have reason to doubt the safety of their deposits and rush en masse to demand their return. As the "What Is Banking?" discussion implies, by their nature, banks are vulnerable to panics because they use short-term assets to make long-term investments. A run of sufficient size on a bank will cause the failure of that bank, and the failure of a bank injures its counterparties and incites runs on those counterparties. Bank panics have a long history in the U.S., but the recent crisis is the first bona fide panic since the 1920s. The creation of the FDIC and deposit insurance in the 1930s eliminated the primary risk of panics in consumer banking, but the financial crisis of 2007–2009 was different. It was a panic in the shadow banking system.²⁰

As house prices fell, subprime borrowers were unable to refinance their mortgages. Because they faced interest rates they could not afford, subprime borrowers began to default on their mortgages. The SPVs that raised funds for their chartering entities by issuing bonds based on expected cash flows found themselves incapable of meeting bondholder-payment obligations. The bonds—which formed the collateral in repo, derivatives, and clearing transactions—ceased to be information-insensitive. Creditors suddenly had a very powerful incentive to discover the nature of the mortgages underwriting their bonds. Because of the secondary market in mortgages and their pooled cash flows, this feat proved impossible. With a powerful incentive to distrust borrowers' ability to repay their obligations, creditors began to withdraw their funds from the repo market through ever-higher "haircuts,"²¹ the requirement that borrowing institutions post collateral at a premium to the cash deposited.²² Table 1 illustrates the magnitude of capital withdrawal through repo haircuts.

As collateral haircuts increased, it became harder to use that collateral in other transactions, for no party wanted to be saddled with an asset whose value was uncertain and likely to decline with reference to the price paid for it; thus the sudden change of RMBSs from information-insensitive to information-intensive bonds desiccated the liquidity of the repo market. As the issuers of collateral, shadow banks and the financial institutions that gave rise to them were forced to raise cash to return deposits to repo creditors. The massive assets sales that provided this cash depressed the price of assets and made repayment of creditors difficult. Once creditors in the repo market began to fear for the security of their deposits, they raced to withdraw their money from their counterparties, precipitating runs on other repo borrowers. Gorton puts it best:

Uncertain about the solvency of counterparties, repo depositors became concerned that the collateral bonds might not be liquid; if all firms wanted to hold cash—a flight to quality—then collateral would have to decline in price to find buyers. This is the crucial link between the subprime shock and other asset categories.²⁴

In this way, the financial crisis can accurately be described as a panic in the shadow banking system.

PART IV: DRAWING CONCLUSIONS

In Parts II and III, I outline four causal narratives for the financial crisis. The first three narratives lack explanatory power because, in their race to assign blame for the crisis on bankers, regulators, or consumers, they are too spare to account for the relationship between subprime-mortgage defaults and the ensuing crisis. The fourth narrative—the financial crisis as a panic in the shadow banking system—can adequately account for the progression of the financial crisis. But causal narratives do more than explain, *ex post*, a crisis; importantly, they shape options concerning future reforms. Table 2 outlines briefly the policy preferences and shortcomings of the three blame-based narratives.

Each of the blame-based narratives sketched above fails to address the causes of panic in the shadow banking system. In this way, they foreclose on meaningful reform. Viewing the financial crisis as a bank panic focuses attention on repo market liquidity and the standards used in establishing high-quality collateral. By eschewing blame,

the bank panic narrative militates policy interventions that monitor the shadow banking and securitization markets, and focuses attentions on the credit-ratings agencies whose bond ratings drove demand for securitized collateral and obscured the riskiness of that collateral. By focusing attention on the profound reach of shadow banking products on firms' day-to-day financing decisions, the bank panic narrative also directs attentions to business practices (such as firms' overreliance on capital markets for short-term financing) that propagate and amplify financial shocks.

AFTERWORD

The initial version of this piece was written in early 2010 as the Senate moved to begin debate on financial-regulatory-reform measures. Since that time, Congress has passed the Dodd-Frank Wall Street Reform and Consumer Protection Act (Public Law 111 – 203), and in late January 2011, the Financial Crisis Inquiry Commission (FCIC) issued its report on the causes of the financial crisis. Despite these milestones, there remains little consensus on an overarching narrative for the crisis. The lack of a popular causal narrative continues to yield inadequate policy and practice.

At the start of this review, I mention some of the extreme measures that the Treasury, Federal Reserve, Congress, and President took to mitigate the worst effects of the financial crisis, but it was a very partial catalog of extraordinary action. For months before the collapse of Lehman Brothers, officials from Treasury and the New York Fed brokered secret meetings among the management teams of ailing and stronger firms, both domestic and international, to facilitate mergers that the federal government would backstop or insure.²⁵ There were two principle reasons for such clandestine actions: (1) federal agencies were unaware of the derivative positions (and consequently, overall financial positions) of vulnerable firms and needed outside auditors to reassess those firms, and (2) federal agencies lacked the legal authority to intervene directly in winding down troubled institutions.

Dodd-Frank changed this picture by making many financial transactions more transparent and by enumerating and arrogating powers of financial regulatory bodies. The act requires that most derivatives trades be placed on exchanges or clearinghouses. It creates a council of regulators to monitor the financial system for systemic risks, and it requires financial institutions to draft

“funeral plans” that articulate exposures and creditors. It establishes regulatory oversight for nonbank financial institutions important to the function of the financial system and grants resolution authority to regulators for the winding down of such institutions.

However, for all that Dodd-Frank does, it is also notable for what it does not do. A fair critique of the legislation is that Dodd-Frank will help to avoid the regulatory confusion that we witnessed in the thick of the financial crisis (which is no small feat), but it does little to redress the conditions that enabled and precipitated the financial crisis in the first place. While the difficulty of that task is doubtless exceptional in any political body, it is exacerbated by the lack of agreement on the structural, rather than proximate, causes of the financial crisis. Part III of this review offers what I believe to be the most compelling causal view, but neither it nor any other narrative has gained the broad legitimacy afforded by an official endorsement. The responsibility to provide such an account fell to the Financial Crisis Inquiry Commission, and its members failed to enumerate the causes of the crisis with a unified voice.

The FCIC was created by an act of Congress (Public Law 111-21) and established a bipartisan panel of notable private citizens with experience in housing, financial markets, banking, and economics. It was given subpoena power and an \$8 million budget to investigate the root causes of the financial crisis. Despite this mandate, the FCIC's members fractured along party lines in issuing their findings. The six commissioners appointed by Democrats issued the official majority report, three commissioners appointed by Republicans issued a dissenting report, and a fourth Republican commissioner issued a separate dissenting report. The majority and primary dissidents share many analyses, but the rupture emerges over whether to deem the financial crisis “avoidable.” The majority believes it was avoidable, and the dissenting minority argues that it was not. It appears that the final commissioner deems the crisis avoidable, but his explanation of the crisis squarely pegs blame on federal housing policy and so differs from the general view of other commissioners.

The two main camps of FCIC commissioners are split on the avoidability question because its answer implies different courses of policy action. The majority emphasize the role that regulation can play to restrain the per-

missive tendencies regarding risk of individuals, firms, and regulatory bodies. The minority's view of the financial crisis is that is akin to an act of nature. They are leery of the same risk-taking behaviors noted by the majority, but faced with the scope of reform measures required

to avoid such a crisis from recurring, they appear to shy away from prescriptive remedies. Both camps still struggle with the vacuum left by the decline of the efficient-markets worldview. The search for a causal narrative of the financial crisis continues.

NOTES

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- 9 David Leonhardt, "Heading Off the Next Financial Crisis," *The New York Times Magazine*, March 22, 2010, 36.
- 10 Regulatory capture is the theory (advanced by George Stigler) that regulatory discretion and power corrupt the function of markets and give incentive to market participants to influence regulators to minimize the competitive threats to incumbents. As a cure, the theory counsels less regulation. It advances an antigovernment position echoed by contemporary critics of the Federal Reserve and the neo-Keynesian fiscal interventions that prevented a depression in response to the economic crisis.
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- 17 Gary Gorton and Andrew Metrick, "Haircuts," NBER Working Paper No. 15273, 2009, 5-8. <http://www.nber.org/papers/w15273.pdf>
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- 19 LIBOR is the acronym for the London Interbank Offered Rate and typically refers to the "one-month LIBOR," a measure of what banks pay for 30-day loans. LIBOR is a common feature of many variable interest-rate agreements.
- 20 Gorton, *Slapped by the Invisible Hand*, 15-45; Leonhardt, *Heading off the Next Financial Crisis*, 36; Lowenstein, *The End of Wall Street*, 136.
- 21 Put another way, haircuts are an instance of market destruction through information asymmetries. In work published in 1970 that later resulted in a Nobel Prize in Economics, George Akerlof describes the effect of information asymmetries on the quality of markets as a "lemons problem." He sketches a model based on the used-car market and posits that the market will cease to function if "lemons" (poor-quality used cars) are unmarked as such and pervasive within the market. Sellers of high-quality used cars will exit the market because used-car prices are depressed by buyers' expectations that they may wind up with a lemon. The remaining cars will be lemons, which buyers will not want to buy.
- 22 Gorton and Metrick, "Haircuts," 1-11.
- 23 ABS = Asset-Backed Securities; CLO = Collateralized Loan Obligation; CMO = Collateralized Mortgage Obligation; CDO = Collateralized Debt Obligation.
- 24 Gorton, *Slapped by the Invisible Hand*, 47.
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BIOGRAPHIES

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Zayne Abdessalam graduated from NYU Wagner in 2010 with a master of urban planning. He is currently a research analyst for the retail, wholesale, and department-store union, UFCW, for which he analyzes local policies around urban-labor issues. Conducting research for the current living-wage campaign, Fair Wages for New Yorkers Act, and also the detrimental effects of Walmart on local communities, his professional and personal research is guided by concern for workers.

Douglas Coulter is a master of public administration candidate specializing in public policy analysis. Originally from Norman, Oklahoma, he moved to New York in 2001 to attend NYU's College of Arts and Sciences. After receiving his degree, he worked at Idealist.org, developing community-outreach programs as well as establishing its multimedia program. His graduate work focuses on telecommunication and technology policy and economic development. He helped form and is the co-chair of the Stonewall Policy Alliance, an LGBTQ and allies student group. During the summer of 2010 he worked on spectrum policy for his internship at the White House Office of Science and Technology Policy.

Rebecca DiBennardo is currently a sociology doctoral student at the University of California, Los Angeles. She holds a bachelor of arts in international studies and Hispanic studies from Vassar College and a master of public administration in health policy from NYU Wagner. Previously, Rebecca served as a National Compton Mentor Fellow, working on issues of health and sexuality among young females, and as a youth program associate at EngenderHealth. During her time at NYU Wagner, she worked as a health policy graduate assistant, teaching assistant, and research assistant. Her current research focuses on gender and sexuality, particularly experiences of stigma in gay families.

Blanca Esquivel is a graduate of NYU Wagner specializing in public health policy. She earned her bachelor of arts in government from Smith College. Currently, Blanca manages several programs that offer case management and supportive services for people living with HIV/AIDS, as well as high-risk HIV-negative individuals in Central and East Harlem. Her research and work interests focus on improving the health outcomes of communities of color in New York City that face high rates of disease. Previously, she has collaborated with or worked at non-profits that empower underserved communities by providing them with access to quality health education and services.

Timothy Farrell is senior communications officer at New Visions for Public Schools, an education non-profit located in New York City. He holds a bachelor of arts in English and American literature from Brown University and a master of public administration from NYU Wagner, from which he graduated in 2010. He has handled media relations for the New York Public Library and NYU's Steinhardt School of Culture, Education, and Human Development. He began his professional career in book publishing and worked as an editor at Random House.

Fernando Henao is a recent graduate of NYU Wagner, where he received a master of public administration and specialized in policy analysis. He currently works as a consultant for the United Nations Development Programme—Bureau for Development Policy in the areas of local development and poverty reduction. He has previously held positions with the government of Colombia, the Colombian Coffee Federation, and USAID, promoting sustainable and viable income-generation projects for vulnerable populations.

Brianne Lute is a second-year NYU Wagner student specializing in public policy. Prior to NYU Wagner,

Brianne worked for the National Democratic Institute for International Affairs (NDI) where she focused on legislative strengthening and executive office assistance programs. For three years, Brianne supported projects worldwide and directly implemented programs in the Balkans and the Middle East. Before NDI, Brianne spent five years working for U.S. Senator Evan Bayh (D-IN). As a member of the senator's senior staff, she supported legislative initiatives as well as strategic and political efforts. Brianne graduated from Indiana University in 2001.

David Colby Reed is a master of public administration student at NYU Wagner and studies issues of global poverty and economic development.

Amalea Smirniotopoulos will be graduating from NYU Wagner and NYU School of Law in May 2011 with a master of public administration and a juris doctor. Before returning to NYU, Amalea worked for the Bronx Defenders, a public defender office in the Bronx. She has interned at the Brennan Center for Justice, the ACLU's National Prison Project, and the Center for Constitutional Rights among other organizations. She graduated from NYU's College of Arts and Sciences in 2005 with bachelor of arts in English.

Alexander J. Wolk received a master of urban planning degree from New York University's Wagner School of Public Service in 2010. While there, he served as a member of the Green Building and Campus Planning Working Group and was also a September 11th Memorial Fellow at the New York City Department of Transportation. Prior to graduate school, he was a program coordinator for Microsoft's Community Affairs program, where he helped implement community technology learning centers throughout Latin America. Currently, Wolk is a project manager at the New York City Department of Environmental Protection and serves on the advisory board of the Gowanus Canal Community Development Corporation.

Michelle R. Wong is a master of public administration candidate specializing in public policy analysis. A native Philadelphian, her policy interests relate to education, poverty, immigrant communities, and voting rights. She hopes to pursue a career in policy and program evaluation. Prior to NYU Wagner, she worked in higher education and federal community

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Kristin Van Busum received her master in public administration in health policy analysis from NYU Wagner in May 2010. She joined RAND Corporation in the health division as a research assistant in July 2010. Van Busum works on a variety of projects addressing workplace health promotion, cost containment, and care quality and access. Prior to coming to RAND, Van Busum was a research data associate at NYU School of Medicine, where she worked on projects that examined patient decisionmaking and use of quality data from a behavioral-economics perspective.

Alissa Vladimir is a recent graduate of NYU Wagner. Before attending NYU, she worked as an account executive at a boutique public relations firm in Philadelphia, creating successful campaigns for clients in fields such as health care, senior housing, hospitality, and entertainment. Alissa graduated summa cum laude with a bachelor of arts in communications from Temple University in Philadelphia. She has also worked at a number of women's empowerment and human rights organizations throughout New York City, including MADRE, the White House Project, and the National Council for Research on Women.

Elizabeth Wolff, M.D. is a board-certified family physician and currently works at the NYU Student Health Center. She has been active in academic medicine for more than 10 years in New York City and served as the medical director of a Federally Qualified Health Center in Manhattan prior to her matriculation at NYU. She graduated from NYU Wagner in January 2011 with a specialization in health policy. Her research interests include electronic health records, physician decisionmaking, models of primary care, and women's reproductive health.

Shana Wright currently works as an assistant research scientist for the NYU School of Medicine. Her work incorporates projects related to substance-abuse interventions as well as addiction research dissemination,

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Sean Capperis is a master of public administration candidate specializing in public policy analysis. A David Bohnett Public Service Fellow at NYU Wagner, he served in the office of Chicago Mayor Richard Daley in summer 2010. Sean currently works as a research assistant on analyses of New York City's land-use regulations at NYU's Furman Center for Real Estate and Urban Policy. Sean holds a bachelor of arts in urban studies and English writing from the University of Pittsburgh and is a member of the Phi Beta Kappa Society. Prior to NYU, Sean worked in community development and city government in Pittsburgh, Pennsylvania.

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Amanda Doreson is a second-year master of public administration student with a specialization in management of public and nonprofit organizations. Prior to attending NYU Wagner, she held communications and fundraising roles at a reproductive-rights organization as well as a Jewish philanthropic organization. This past summer, Amanda worked at the NYC Department of Health performing an evaluation of New York City's Healthy Teens' Initiative. She has also written many policy reports on estimating impacts of foundations on the local legislative landscape. Amanda graduated summa cum laude from Washington University in St. Louis with a bachelor's degree in political science and women's studies.

REVIEWERS

Boykin Clarke is a first-year master of public administration student specializing in international policy and management. He has a bachelor of arts in international affairs and African studies from the University of Georgia in Athens. Prior to attending NYU Wagner, he worked with both domestic non-profit organizations and international private corporations as a community outreach specialist helping both types of organizations

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Emma Taya Darch is a 2012 master of public administration candidate in international public policy and non-profit management. She holds an L.L.B. from the University of Cape Town, South Africa. Before attending NYU Wagner, she worked in Dar es Salaam, Tanzania, where she assisted in the launching of a job recruitment agency for people with disabilities. She also coordinated a project on trade capacity building in agriculture at UNIDO. A pan-Africa optimist, Taya plans to return to the continent upon completion of her studies.

Susan Hayes is a master of public administration candidate specializing in health policy. Prior to NYU Wagner, she had a lengthy career as a magazine editor and writer, including senior staff positions at *Woman's Day* and *National Geographic Kids*. She has a longstanding interest in health and has written and edited articles on health topics for numerous magazines, including *Natural Health*, *Parent & Child*, *Prevention*, and *Weight Watchers*. She is the co-author, with Naomi Steiner, M.D., a developmental-behavioral pediatrician at Tufts Medical Center, of *7 Steps to Raising a Bilingual Child*. Susan holds an A.B. in English from Dartmouth College.

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Kate Horner is a master of public administration candidate whose primary research interest is the intersection of women's rights, power dynamics, and international development. Before coming to NYU Wagner, Kate worked several years for an international anti-trafficking organization and was a leader in community organizing against trafficking in the Washington, D.C., area. She has frequently spoken publicly about

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Barbara Kiviat is a master of public administration candidate specializing in public policy analysis and is also a David Bohnett Public Service Fellow. She holds a bachelor of arts in the Writing Seminars from Johns Hopkins University and a master of arts in journalism from Columbia University. She works as a research assistant at the Financial Access Initiative, a research consortium housed at NYU Wagner. Barbara previously worked as a journalist, most recently covering business and economics at *Time* magazine, and she continues to freelance.

Steven Kohn is a first-year master of public administration student with a specialization in international policy and management. Steven has a bachelor of arts from Georgia State University in community psychology and a post-baccalaureate certificate in non-profit management and fundraising from Louisiana State University, Shreveport. Steven's public service experience includes a service year with AmeriCorps NCCC Class 14 of 2008. He also spent a year as a freelance grant writer for the city of Huntsville, Texas, focusing his efforts on affordable housing and environmental issues. Steven currently moonlights as a tutor on the weekends, but once completed with school, he seeks an international engagement to work on sustainable community building.

David Krantz is a freelance journalist whose work has been published worldwide by the Associated Press, ESPN.com, and the *Jerusalem Post*. An associate editor of *PresentTense* magazine, David completed his first master's degree at the University of California, Berkeley, Graduate School of Journalism. He is a first-year student in the Wagner-Skirball dual-degree program in non-profit management and Judaic studies.

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Sarah Schwimmer is a master of public administration candidate with a specialization in international policy and management. Prior to enrolling at NYU, she spent six years in Washington, D.C., where she worked for World Wildlife Fund and the United States Senate. She currently works for a start-up non-profit focused on improving quality of life in rural Uganda. Originally from Chicago, Sarah is especially interested in the relationship between natural-resource management and poverty, and she spends her free time training for the NYC Marathon.

SENIOR EDITORS

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Tom Ogletree is a master of public administration candidate specializing in public policy and currently works in the corporate social engagement division of Changing Our World, a fundraising and philanthropy consulting firm. Before coming

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EDITORS

Nora Anderson is a master of public administration candidate specializing in international health policy and management. She is currently an intern at the United Nations Children's Fund in the Knowledge Management unit. Prior to attending NYU Wagner, Nora worked as both a staffer and consultant for domestic political campaigns. She received her bachelor of arts in political science with a concentration in social and economic justice from the University of North Carolina in Chapel Hill.

Supurna Banerjee is a master of public administration candidate with a specialization in international policy and management. She worked as an editor in the book publishing industry for seven years and currently acts as the co-director of Write on Brooklyn, a company she co-founded that provides writing and consulting services to aspiring authors and nonprofit organizations. Supurna, who is interested in policy work in the areas of humanitarian relief issues, human rights, women's rights, and postconflict development, graduated with a bachelor of arts degree from Amherst College.

Stacy Edwards is a master of public administration candidate specializing in public policy analysis. She holds a bachelor of arts in sociology and communication from Texas A&M University. Because of her wide variety of interests, Stacy has held communication, marketing, and organizing roles at a number of organizations. These include the food organization Basis, the social network Jumo, Habitat for Humanity, and the Wagner Food Policy Network. She is currently interning as a social media strategist at StrawberryFrog.

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Alexander Habib is a master of public administration candidate specializing in public policy analysis. He holds a bachelor of arts in political science from Rowan University. Born and raised in New Jersey, his background is in politics and state government. Alex has worked in emergency management, three state legislative offices, and a number of successful campaigns. In 2008 he was named a Rising Star in N.J. Politics. He currently serves as chief of staff to a member of New Jersey's General Assembly and advises on issues including but not limited to education, public finance, commerce, economic development, housing, and the environment.

Li Huang is a master of public administration candidate with a specialization in financial management and public finance. She previously participated in an international dual-degree program between NYU and Southwest Jiaotong University from 2005 to 2009 and holds a bachelor of science degree in integrated digital media from New York University and a bachelor of arts degree in communication studies from Southwest Jiaotong University in China. Li anticipates a career as a financial analyst or investment counselor. Originally from Hunan, China, Li Huang's interests include financial policy and strategic communication.

Carlyn Maksymuk is a master of urban planning candidate. After obtaining a degree in landscape architecture from Cornell University, Carlyn conducted research on zoo exhibit design in Europe. She has since worked as a landscape-architectural designer on diverse projects such as animal exhibits for the Bronx Zoo, a Brooklyn streetscape, and a LEED-certified recreation facility in Prospect Park, among others. In those roles, she gained an interest in sustainable design and environmental compliance. Carlyn hopes to one day work to develop environmental policy and regulations that will enhance environmental sustainability and public health in our urban areas.

Elisabeth Sewall is a first-year NYU Wagner student with a background in journalism, human rights, and non-profit program management. Most recently, she managed a volunteer program at Physicians for Human Rights that provided asylum seekers with access to medical assistance to support their legal claims for asylum in the U.S. Earlier, Sewall conducted research on contemporary Ukrainian national identity through a Fulbright fellowship and worked at the *Kyiv Post*

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Allie Skayne is a master of public administration candidate specializing in international policy. She received a bachelor of arts degree from New York University in English and American literature. Allie currently works in New York Mayor Michael Bloomberg's Correspondence Unit as a writer. Her academic interests include New York City public policy, women's issues, and international development.

Valerie Stevens is a master of public administration candidate studying international development and finance. She holds a bachelor of arts with honors in applied economics from Queen's University and a juris doctor from the University of Toronto. Before attending NYU Wagner, Valerie was an attorney at Hodgson Russ, specializing in mergers and acquisitions and antitrust law.

