

**Appendix**

**Immigration, Employment Opportunities,  
and Criminal Behavior**

**Online Appendix**

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## Appendix

### A. Theoretical Framework

To motivate the empirical analysis in Freedman, Owens, and Bohn (2017), we develop a simple model relating work, crime, and legal status. The model is not intended to capture all possible channels through which legal status could affect decisions to engage in crime, but rather is aimed at highlighting the key mechanisms we explore in the empirical analysis. The model builds on Lochner and Moretti (2004), who consider how schooling interacts with decisions to work and engage in crime.

Letting  $s$  denote legal residency status, individuals in the model can be native citizens or immigrants; after an amnesty (as under IRCA), the latter group is separated into newly legalized residents and illegal residents unauthorized to work in the formal market (perhaps because they failed to meet amnesty eligibility requirements). We will consider decisions of individuals in each group regarding how to allocate their time between formal market work and crime, where  $k_t$  denotes the fraction of time engaged in crime at age  $t$ . We assume that individuals are homogeneous except with respect to their legal status  $s$ , and thus denote the wage rate at age  $t$  in the formal labor market as  $w_t(s)$ . Meanwhile, the net return to crime is denoted  $r(k_t)$ , where  $r'(k_t) > 0$ .<sup>1</sup> Let  $\pi(k_t, s)$  be the probability of being caught and punished for committing a crime, which is increasing in  $k_t$  and also allowed to vary with legal residency status due to potential differences in reporting patterns or police treatment. We assume that the punishment if caught,  $p(s)$ , is also a function of legal status; for simplicity, we assume that  $p(s)$  is measured in terms of utility. As we discuss further below, how  $\pi(k_t, s)$  and  $p(s)$  vary with  $s$  has implications for the likely impact of legal employment opportunities on criminal activity.

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<sup>1</sup> We could allow  $r(k_t)$  to also be a function of  $s$ ; Lochner and Moretti (2004), for example, allow the net return to crime to vary both with time spent engaging in crime and on educational attainment. While punishment might be expected to vary with  $s$  (which we allow for in the model), there is no reason to think that the net return to crime would vary with  $s$ .

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In each time period, an individual consumes the income generated through formal work and by engaging in criminal activity, which is  $y_t = w_t(s)(1 - k_t) + r(k_t)$ . By consuming this income, the individual receives utility  $u(y_t)$ , where  $u'(y_t) > 0$  and  $u''(y_t) \leq 0$ . Therefore, we can write an individual's maximization problem for a given legal status  $s$  as

$$V(s) = \max_{\{k_t\}_{t=0}^T} \left\{ \sum_{t=0}^T \beta^t [u(w_t(s)(1 - k_t) + r(k_t)) - \pi(k_t, s)p(s)] \right\}.$$

Here,  $\beta \in [0, 1]$  is the individual's discount factor, and  $T$  denotes the total amount of time he or she has to work or engage in crime. Having chosen the optimal amount of time to allocate to legal work and criminal activity,  $V(s)$  is the lifetime value associated with a particular legal residency status  $s$ , where  $s$  includes native citizens, newly legalized residents, and illegal residents.

Assuming an interior solution, the first-order condition with respect to  $k_t$  is

$$r'(k_t) - w_t(s) = \frac{\partial \pi(k_t, s)}{\partial k_t} \frac{p(s)}{u'(y_t)}.$$

This condition yields several insights. First, note that the right-hand side of the expression is greater than or equal to zero.<sup>2</sup> Assuming there is some punishment if caught committing a crime ( $p(s) > 0$ ), the marginal return to criminal activity must be greater than the wage to compensate individuals for the risk of being caught and punished. The compensating differential must be greater the faster the probability of being caught increases with additional criminal activity.

More important for our empirical analysis, the first-order condition highlights several important channels through which legal residency status could affect decisions to engage in crime. First, legal residency status could affect wages; higher wages will tend to reduce time devoted to criminal activity. Second, legal status

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<sup>2</sup> In the case in which there is no anticipated punishment, we arrive at  $r'(k_t) = w_t(s)$ , similar to Grogger (1998).

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could affect the probability of being caught committing crime. If the propensity to report crimes differs across groups or police treat groups differently (potentially due to changes in immigration policy, as in Bohn, Freedman, and Owens (2015)), crime rates (or at least observed crime rates) may vary across groups. Third, legal residency status could affect punishment if caught engaging in criminal activity. For example, if immigrants who are in the country illegally are deported for committing a felony, whereas native citizens are only imprisoned,  $p$  might be perceived as higher for a given crime among unauthorized immigrants.

## Appendix

### B. Supplementary Tables and Figures

TABLE A1—POPULATION, UNDOCUMENTED IMMIGRANTS, AND IRCA AMNESTY APPLICANTS FOR  
SELECTED STANDARD METROPOLITAN STATISTICAL AREAS

SMSA	Population (1980) <sup>a</sup>	Estimated No. of Undocumented Immigrants (1980) <sup>b</sup>	IRCA Amnesty Applicants		
			Total Applicants <sup>b</sup>	Percent of Estimated Undocumented	Percent of Population
Los Angeles	7,477,503	657,900	769,458	116.96	10.29
Houston	2,905,353	51,956	137,750	265.13	4.74
New York	9,120,346	211,658	138,792	65.57	1.52
Chicago	7,103,624	127,113	148,428	116.77	2.09
El Paso	479,899	15,696	48,170	306.89	10.04
San Antonio	1,071,954	13,041	28,891	221.54	2.70
San Jose	1,295,071	26,477	41,230	155.72	3.18
Miami	1,625,781	49,672	78,878	158.80	4.85

Notes: <sup>a</sup> 1980 Census of Population. <sup>b</sup> Adapted from Baker (1990).

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TABLE A2–SUMMARY STATISTICS FOR ALL CRIME TYPES, BY ETHNICITY AND BEFORE AND AFTER LAW AMNESTY

Charge	Crime Type	Hispanic Residents				Non-Hispanic Residents			
		Pre-LAW		Post-LAW		Pre-LAW		Post-LAW	
		Total	Per BG-Month	Total	Per BG-Month	Total	Per BG-Month	Total	Per BG-Month
Arson	Non-Inc	47	0.001	34	0.002	43	0.001	27	0.001
Assault	Non-Inc	396	0.011	213	0.011	286	0.008	165	0.008
Inter-Family Assault	Non-Inc	17	0.000	18	0.001	13	0.000	16	0.001
Burglary	Income	1925	0.052	1167	0.058	1400	0.038	733	0.037
Car Theft	Income	149	0.004	153	0.008	137	0.004	108	0.005
Drug Crime	Income	1886	0.051	2125	0.106	1533	0.041	1762	0.088
Offenses Against Children	Non-Inc	196	0.005	156	0.008	145	0.004	92	0.005
Conspiracy	Non-Inc	1	0.000	4	0.000	2	0.000	1	0.000
Corruption	Non-Inc	23	0.001	19	0.001	15	0.000	11	0.001
Public Order Offense	Non-Inc	0	0.000	0	0.000	0	0.000	0	0.000
Evasion of Arrest	Non-Inc	16	0.000	14	0.001	8	0.000	2	0.000
Fraud	Income	616	0.017	389	0.019	829	0.022	489	0.024
Gambling	Income	4	0.000	5	0.000	0	0.000	8	0.000
Kidnapping	Non-Inc	20	0.001	4	0.000	35	0.001	3	0.000
Larceny	Income	492	0.013	322	0.016	624	0.017	346	0.017
Manslaughter	Non-Inc	43	0.001	18	0.001	30	0.001	15	0.001
Murder	Non-Inc	293	0.008	130	0.007	227	0.006	93	0.005
Destruction of Property	Non-Inc	55	0.001	59	0.003	51	0.001	22	0.001
Prostitution	Income	1	0.000	2	0.000	4	0.000	1	0.000
Rape	Non-Inc	371	0.010	288	0.014	269	0.007	175	0.009
Robbery	Income	515	0.014	207	0.010	520	0.014	357	0.018
Sexual Assault	Non-Inc	14	0.000	7	0.000	5	0.000	3	0.000
Trespassing	Non-Inc	1	0.000	0	0.000	2	0.000	0	0.000
Unauth. Use of Vehicle	Non-Inc	500	0.014	295	0.015	465	0.013	226	0.011
Weapons Violations	Non-Inc	196	0.005	77	0.004	118	0.003	52	0.003
Total Charges		7,777	0.210	5,706	0.285	6,761	0.183	4,707	0.235
Income-Generating		5,588	0.151	4,370	0.219	5,047	0.136	3,804	0.190
Non-Income Generating		2,189	0.059	1,336	0.067	1,714	0.046	903	0.045
Observations		37,000		20,000		37,000		20,000	

Notes: Figures derived from Bexar County District Court felony charge records. Pre-LAW includes April 1985-April 1988. Post-LAW includes May 1988-December 1989. "BG" denotes block group.

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TABLE A3—IRCA AND FELONY CHARGES FOR ALL CRIMES,  
ALTERNATIVE SPECIFICATIONS

	Baseline	Extreme Population	Linear Probability	Ln Charges
Hispanic Defendant	0.067*** [0.025]	0.090*** [0.025]	0.022*** [0.005]	0.109*** [0.023]
Immigrant Destination Index	0.003 [0.006]	0.003 [0.006]	-0.004*** [0.001]	-0.020*** [0.005]
IRCA Enacted	0.069*** [0.023]	0.069*** [0.023]	0.012*** [0.004]	0.058*** [0.019]
LAW Expiration	0.135*** [0.030]	0.135*** [0.030]	0.024*** [0.005]	0.123*** [0.025]
SAW Expiration	0.003 [0.032]	0.003 [0.032]	-0.0002 [0.005]	-0.005 [0.026]
Hispanic × IRCA	-0.067** [0.030]	-0.060** [0.030]	-0.011** [0.005]	-0.054** [0.026]
Hispanic × LAW Expiration	0.109** [0.043]	0.073* [0.043]	0.020*** [0.008]	0.098*** [0.037]
Hispanic × SAW Expiration	0.001 [0.044]	0.004 [0.044]	0.003 [0.008]	0.012 [0.038]
Immigrant Destination Index × IRCA	0.003 [0.006]	0.003 [0.006]	-0.0002 [0.001]	-0.001 [0.004]
Immigrant Destination Index × LAW Expiration	-0.005 [0.008]	-0.005 [0.008]	-0.001 [0.001]	-0.008 [0.006]
Immigrant Destination Index × SAW Expiration	-0.001 [0.008]	-0.001 [0.008]	-0.0005 [0.001]	-0.002 [0.006]
Hispanic × Immigrant Destination Index	0.119*** [0.007]	0.116*** [0.007]	0.031*** [0.001]	0.151*** [0.006]
Hispanic × Immigrant Destination Index × IRCA	-0.008 [0.008]	-0.009 [0.008]	-0.001 [0.001]	-0.005 [0.007]
Hispanic × Immigrant Destination Index × LAW Exp.	0.035*** [0.012]	0.040*** [0.012]	0.008*** [0.002]	0.042*** [0.010]
Hispanic × Immigrant Destination Index × SAW Exp.	0.002 [0.012]	0.001 [0.012]	0.001 [0.002]	0.002 [0.010]
R <sup>2</sup>	0.034	0.032	0.051	0.052
Mean of Dependent Variable	-3.735	-3.728	0.161	-3.829
Observations	114,000	114,000	114,000	114,000

*Notes:* The unit of observation is census block group by month by ethnicity in Bexar County for April 1985-December 1989. The dependent variables are different measures of felony charges for all crimes at the block group-month level (see text). The immigrant destination index is the sum of the standardized values of the poverty rate, percent Mexican, percent foreign born, people per housing unit, and percent speaking Spanish at home for each block group. Standard errors in brackets allow for arbitrary correlation in crime measure within block group; significant at the \* 10% level, \*\* 5% level, and \*\*\* 1% level.

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TABLE A4—IRCA AND FELONY CHARGES FOR NON-INCOME GENERATING CRIMES,  
ALTERNATIVE SPECIFICATIONS

	Baseline	Extreme Population	Linear Probability	Ln Charges
Hispanic Defendant	0.046*** [0.013]	0.053*** [0.013]	0.012*** [0.002]	0.057*** [0.012]
Immigrant Destination Index	0.0001 [0.003]	0.0001 [0.003]	-0.001*** [0.000]	-0.006*** [0.002]
IRCA Enacted	-0.009 [0.012]	-0.009 [0.012]	-0.002 [0.002]	-0.009 [0.010]
LAW Expiration	0.002 [0.015]	0.002 [0.015]	0.001 [0.003]	0.004 [0.013]
SAW Expiration	-0.006 [0.016]	-0.006 [0.016]	-0.002 [0.003]	-0.007 [0.014]
Hispanic × IRCA	-0.023 [0.017]	-0.021 [0.017]	-0.004 [0.003]	-0.02 [0.014]
Hispanic × LAW Expiration	0.046** [0.023]	0.035 [0.023]	0.008* [0.004]	0.038* [0.020]
Hispanic × SAW Expiration	0.014 [0.024]	0.015 [0.024]	0.004 [0.004]	0.015 [0.021]
Immigrant Destination Index × IRCA	0.003 [0.003]	0.003 [0.003]	0.0003 [0.000]	0.002 [0.002]
Immigrant Destination Index × LAW Expiration	-0.004 [0.004]	-0.004 [0.004]	-0.0004 [0.001]	-0.002 [0.003]
Immigrant Destination Index × SAW Expiration	0.001 [0.004]	0.001 [0.004]	0.0001 [0.001]	0.0004 [0.003]
Hispanic × Immigrant Destination Index	0.042*** [0.004]	0.041*** [0.004]	0.011*** [0.001]	0.051*** [0.003]
Hispanic × Immigrant Destination Index × IRCA	-0.012** [0.005]	-0.012** [0.005]	-0.002*** [0.001]	-0.011*** [0.004]
Hispanic × Immigrant Destination Index × LAW Exp.	0.007 [0.006]	0.008 [0.007]	0.001 [0.001]	0.007 [0.006]
Hispanic × Immigrant Destination Index × SAW Exp.	0.001 [0.006]	0.001 [0.006]	0.0003 [0.001]	0.001 [0.006]
R <sup>2</sup>	0.009	0.009	0.014	0.015
Mean of Dependent Variable	-4.367	-4.365	0.045	-4.392
Observations	114,000	114,000	114,000	114,000

*Notes:* The unit of observation is census block group by month by ethnicity in Bexar County for April 1985-December 1989. The dependent variables are different measures of felony charges for non-income generating crimes at the block group-month level (see text). The immigrant destination index is the sum of the standardized values of the poverty rate, percent Mexican, percent foreign born, people per housing unit, and percent speaking Spanish at home for each block group. Standard errors in brackets allow for arbitrary correlation in crime measure within block group; significant at the \* 10% level, \*\* 5% level, and \*\*\* 1% level.

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TABLE A5—IRCA AND FELONY CHARGES FOR DRUG CRIMES,  
ALTERNATIVE SPECIFICATIONS

	Baseline	Extreme Population	Linear Probability	Ln Charges
Hispanic Defendant	0.022* [0.011]	0.026** [0.012]	0.006*** [0.002]	0.032*** [0.010]
Immigrant Destination Index	-0.0005 [0.002]	-0.0005 [0.002]	-0.001*** [0.000]	-0.005*** [0.002]
IRCA Enacted	0.064*** [0.012]	0.064*** [0.012]	0.011*** [0.002]	0.054*** [0.010]
LAW Expiration	0.164*** [0.020]	0.164*** [0.020]	0.031*** [0.004]	0.148*** [0.017]
SAW Expiration	0.011 [0.020]	0.011 [0.020]	0.001 [0.004]	0.002 [0.017]
Hispanic × IRCA	-0.011 [0.016]	-0.009 [0.016]	-0.001 [0.003]	-0.005 [0.014]
Hispanic × LAW Expiration	0.030 [0.028]	0.020 [0.028]	0.007 [0.005]	0.032 [0.025]
Hispanic × SAW Expiration	-0.022 [0.030]	-0.021 [0.030]	-0.003 [0.005]	-0.012 [0.026]
Immigrant Destination Index × IRCA	0.001 [0.003]	0.001 [0.003]	-0.0004 [0.000]	-0.002 [0.002]
Immigrant Destination Index × LAW Expiration	-0.012** [0.005]	-0.012** [0.005]	-0.003*** [0.001]	-0.014*** [0.004]
Immigrant Destination Index × SAW Expiration	0.007 [0.005]	0.007 [0.005]	0.001 [0.001]	0.005 [0.004]
Hispanic × Immigrant Destination Index	0.032*** [0.003]	0.031*** [0.003]	0.008*** [0.001]	0.039*** [0.003]
Hispanic × Immigrant Destination Index × IRCA	0.008* [0.005]	0.008* [0.005]	0.002*** [0.001]	0.011*** [0.004]
Hispanic × Immigrant Destination Index × LAW Exp.	0.047*** [0.007]	0.049*** [0.008]	0.011*** [0.001]	0.051*** [0.007]
Hispanic × Immigrant Destination Index × SAW Exp.	-0.008 [0.008]	-0.008 [0.008]	-0.001 [0.001]	-0.005 [0.007]
R <sup>2</sup>	0.023	0.022	0.030	0.031
Mean of Dependent Variable	-4.331	-4.329	0.052	-4.358
Observations	114,000	114,000	114,000	114,000

*Notes:* The unit of observation is census block group by month by ethnicity in Bexar County for April 1985–December 1989. The dependent variables are different measures of felony charges for drug crimes at the block group-month level (see text). The immigrant destination index is the sum of the standardized values of the poverty rate, percent Mexican, percent foreign born, people per housing unit, and percent speaking Spanish at home for each block group. Standard errors in brackets allow for arbitrary correlation in crime measure within block group; significant at the \* 10% level, \*\* 5% level, and \*\*\* 1% level.

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TABLE A6—IRCA AND FELONY CHARGES FOR INCOME GENERATING CRIMES,  
QUARTERLY ESTIMATES

	Without Lagged LAW Effects	With Lagged LAW Effects
Hispanic Defendant	0.079* [0.048]	0.079* [0.048]
Immigrant Destination Index	0.010 [0.011]	0.010 [0.011]
IRCA Enacted	0.148*** [0.047]	0.148*** [0.047]
LAW Expiration	0.323*** [0.045]	0.323*** [0.045]
Hispanic × IRCA	-0.134** [0.061]	-0.134** [0.061]
Hispanic × LAW Expiration	0.114* [0.061]	0.104 [0.086]
Hispanic × Time Since LAW Expiration		-0.077 [0.052]
Hispanic × Time Since LAW Expiration <sup>2</sup>		0.018** [0.008]
Immigrant Destination Index × IRCA	0.002 [0.013]	0.002 [0.013]
Immigrant Destination Index × LAW Expiration	-0.003 [0.013]	-0.002 [0.021]
Immigrant Destination Index × Time Since LAW		-0.0001 [0.016]
Immigrant Destination Index × Time Since LAW <sup>2</sup>		-0.0001 [0.003]
Hispanic × Immigrant Destination Index	0.192*** [0.013]	0.192*** [0.013]
Hispanic × Immigrant Destination Index × IRCA	-0.002 [0.017]	-0.002 [0.017]
Hispanic × Immigrant Destination Index × LAW	0.047*** [0.016]	0.051* [0.030]
Hispanic × Imm. Dest. Index × Time Since LAW		-0.012 [0.021]
Hispanic × Imm. Dest. Index × Time Since LAW <sup>2</sup>		0.002 [0.003]
R <sup>2</sup>	0.060	0.060
Mean of Dependent Variable	-2.936	-2.936
Observations	38,000	38,000

*Notes:* The unit of observation is census block group by quarter by ethnicity in Bexar County for 1985Q2-1989Q4. The dependent variable is the natural log of felony charges for income generating crimes divided by the estimated ethnicity-specific population at the block group-quarter level (see text). The immigrant destination index is the sum of the standardized values of the poverty rate, percent Mexican, percent foreign born, people per housing unit, and percent speaking Spanish at home for each block group. Standard errors in brackets allow for arbitrary correlation in crime measure within block group; significant at the \* 10% level, \*\* 5% level, and \*\*\* 1% level.

## Appendix

TABLE A7—IRCA AND FELONY CONVICTION RATES, PARSIMONIOUS SPECIFICATION

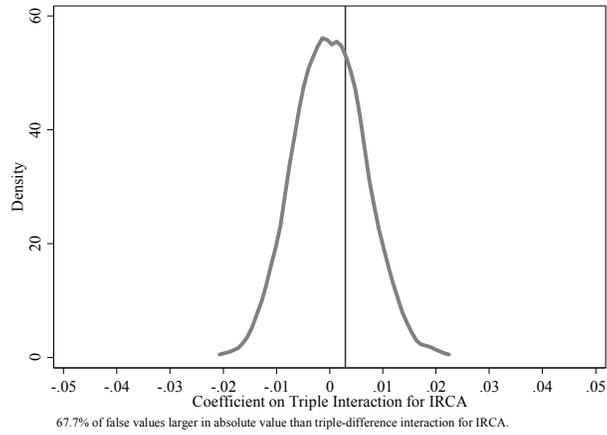
	Income Generating Crimes	Non-Income Generating Crimes	Drug Crimes	Drug Crimes, Excl. Non-Hispanic Whites
Hispanic Defendant	4.129*** [1.583]	2.071 [2.595]	7.154** [2.778]	1.835 [3.672]
Immigrant Destination Index	1.341*** [0.280]	0.363 [0.488]	1.540*** [0.536]	1.771** [0.727]
IRCA Enacted	3.506*** [1.336]	1.918 [2.473]	1.166 [2.499]	-2.28 [3.800]
LAW Expiration	2.128 [1.627]	-4.592 [3.370]	4.045 [2.463]	6.499** [3.177]
SAW Expiration	-1.777 [1.701]	0.316 [3.564]	-2.453 [2.429]	-2.344 [3.012]
Hispanic × IRCA	-1.829 [2.105]	-1.861 [3.800]	-5.313 [3.585]	-1.64 [4.493]
Hispanic × LAW Expiration	-2.481 [2.570]	10.663** [4.687]	-1.081 [3.948]	-4.156 [4.538]
Hispanic × SAW Expiration	1.601 [2.631]	-3.523 [4.688]	1.499 [3.970]	2.764 [4.501]
Immigrant Destination Index × IRCA	-0.739** [0.371]	0.200 [0.672]	0.057 [0.699]	-0.935 [0.968]
Immigrant Destination Index × LAW Expiration	0.65 [0.440]	1.012 [0.991]	-0.153 [0.673]	0.112 [0.848]
Immigrant Destination Index × SAW Expiration	-0.337 [0.437]	0.016 [1.046]	-0.683 [0.690]	-0.899 [0.838]
Hispanic × Immigrant Destination Index	-0.39 [0.364]	0.182 [0.642]	-0.649 [0.649]	-1.159 [0.811]
Hispanic × Immigrant Destination Index × IRCA	0.645 [0.489]	0.614 [0.892]	0.237 [0.849]	1.387 [1.041]
Hispanic × Immigrant Destination Index × LAW Exp.	-0.646 [0.595]	-2.283* [1.262]	-0.055 [0.895]	-0.390 [1.076]
Hispanic × Immigrant Destination Index × SAW Exp.	1.050* [0.596]	-0.090 [1.312]	1.152 [0.921]	1.218 [1.090]
R <sup>2</sup>	0.014	0.010	0.021	0.010
Mean of Dependent Variable	71.096	62.519	74.942	78.313
Observations	14,487	5,130	5,906	4,145

*Notes:* The unit of observation is census block group by month by ethnicity in Bexar County for April 1985-December 1989. The dependent variable is the number of convictions divided by the number of felony charges for various crimes multiplied by 100 at the block group-month level (see text). The immigrant destination index is the sum of the standardized values of the poverty rate, percent Mexican, percent foreign born, people per housing unit, and percent speaking Spanish at home for each block group. Standard errors in brackets allow for arbitrary correlation in crime measure within block group; significant at the \* 10% level, \*\* 5% level, and \*\*\* 1% level.

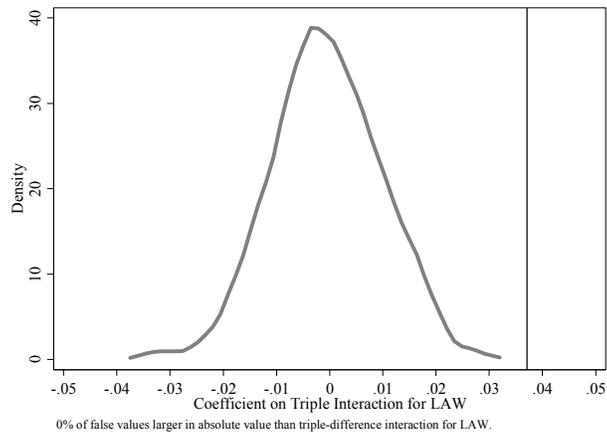
## Appendix

FIGURE A1. COEFFICIENT ESTIMATES FROM RANDOM ASSIGNMENT OF IMMIGRANT DESTINATION INDEX VALUES TO BLOCK GROUPS, INCOME GENERATING CRIMES

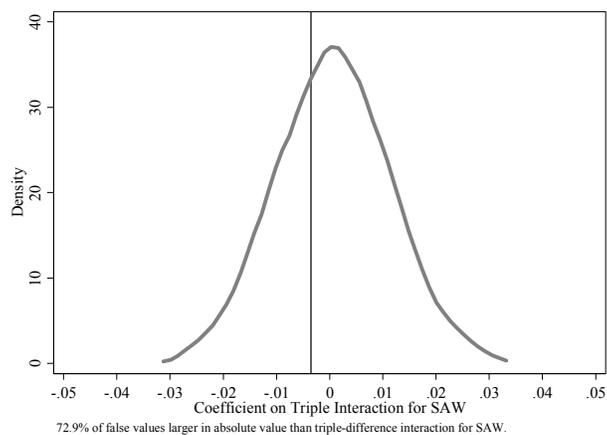
### A. IRCA Enactment



### B. LAW Expiration



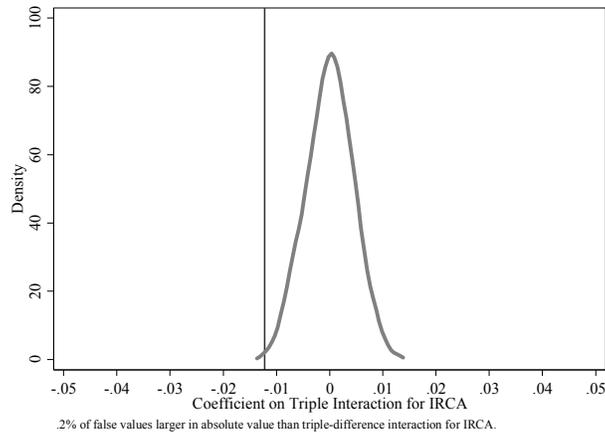
### C. SAW Expiration



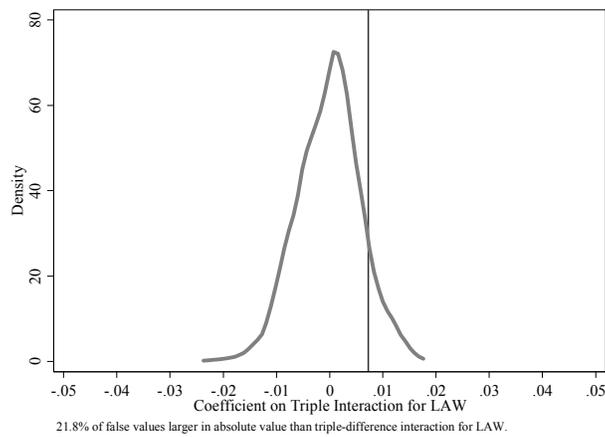
## Appendix

FIGURE A2. COEFFICIENT ESTIMATES FROM RANDOM ASSIGNMENT OF IMMIGRANT DESTINATION INDEX VALUES TO BLOCK GROUPS, NON-INCOME GENERATING CRIMES

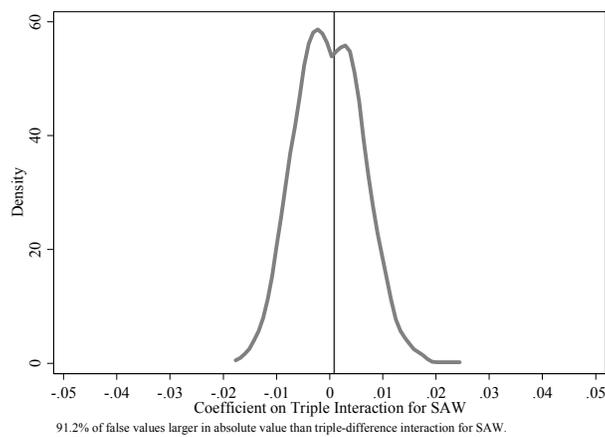
### A. IRCA Enactment



### B. LAW Expiration



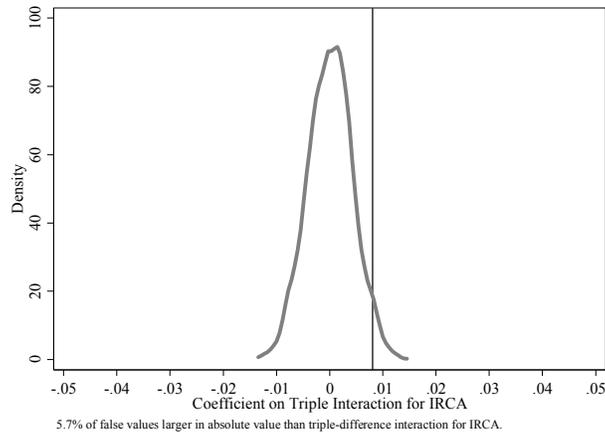
### C. SAW Expiration



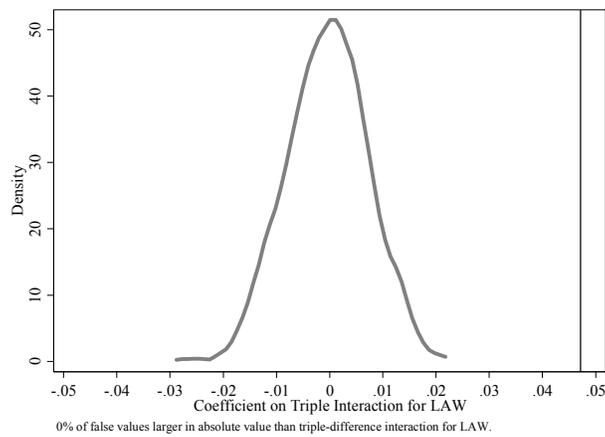
## Appendix

FIGURE A3. COEFFICIENT ESTIMATES FROM RANDOM ASSIGNMENT OF IMMIGRANT DESTINATION INDEX VALUES TO BLOCK GROUPS, DRUG CRIMES

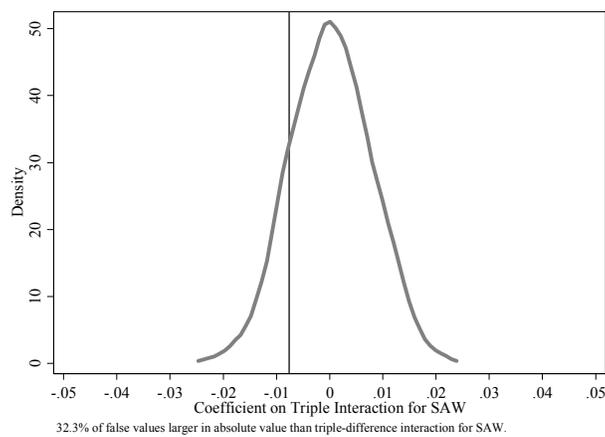
### A. IRCA Enactment



### B. LAW Expiration



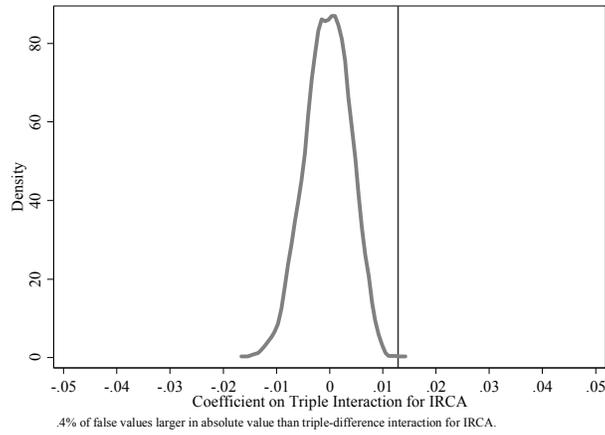
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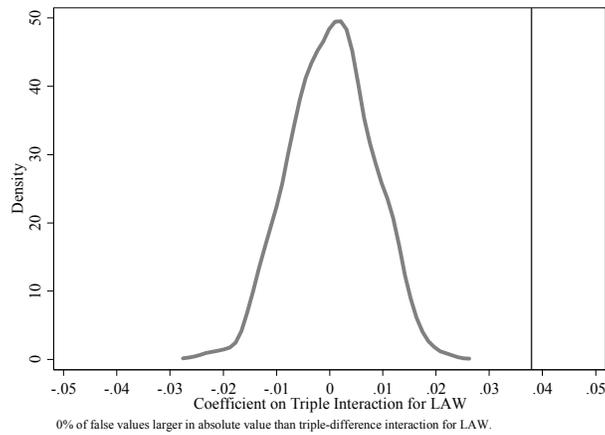
## Appendix

FIGURE A4. COEFFICIENT ESTIMATES FROM RANDOM ASSIGNMENT OF IMMIGRANT DESTINATION INDEX VALUES TO BLOCK GROUPS, DRUG CRIMES EXCLUDING NON-HISPANIC WHITES

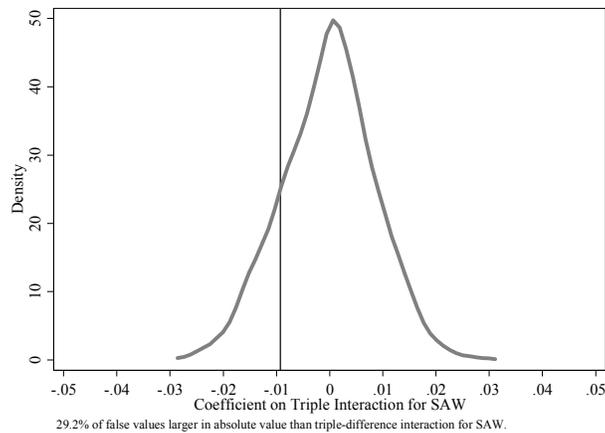
### A. IRCA Enactment



### B. LAW Expiration



### C. SAW Expiration



## Appendix

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