

**Online Appendix:**

**Deterring Illegal Entry:**

**Migrant Sanctions and Recidivism in Border Apprehensions**

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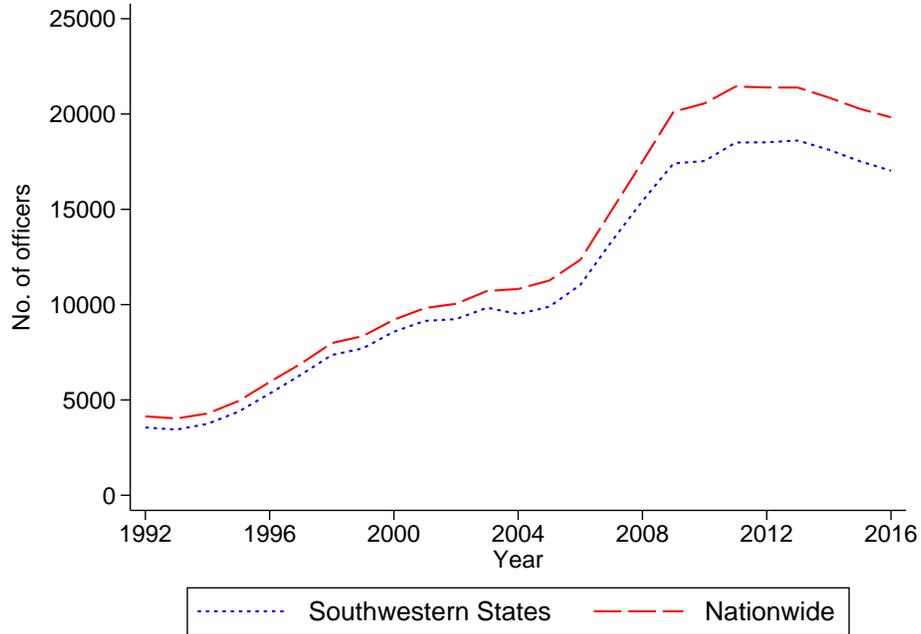
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June 2020

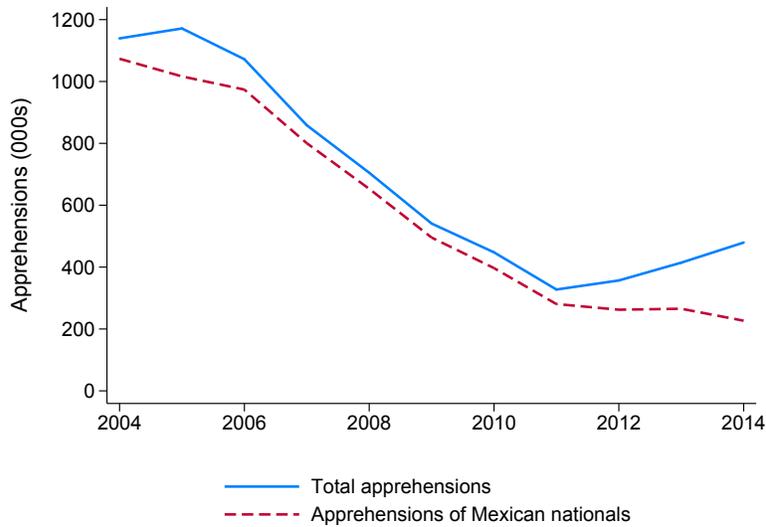
## Appendix A: Figures and Tables

Figure A1: Number of Border Patrol Officers along Southwestern Border and Nationwide



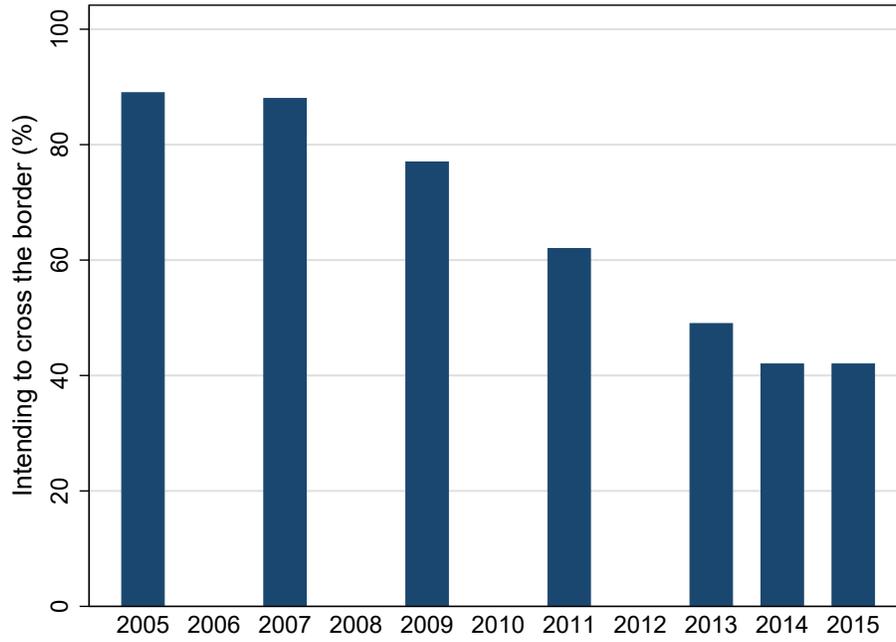
Note: Data are from the U.S. Customs and Border Protection, *CBP Border Security Report, FY2017*.

Figure A2: Apprehensions by the U.S. Border Patrol at the Southwestern Border



Note: Data are from the U.S. Department of Homeland Security, *Yearbook of Immigration Statistics*, various years.

Figure A3: Apprehended Migrants Intending to Cross the Border within Next 3 Months



*Note:* Data are from EMIF-Norte Surveys (Surveys of Migration in the Northern Border of Mexico) 2005 to 2015 and Roberts (2017).

Table A1: Summary Statistics

Characteristics of migrant		Fraction	Location, time of apprehension		Fraction
Age	16-17	0.049	Border Patrol sector	San Diego	0.173
	18-20	0.159		El Centro	0.059
	21-24	0.189		Yuma	0.013
	25-28	0.175		Tucson	0.531
	29-33	0.178		El Paso	0.035
	34-40	0.163		Big Bend	0.007
	41-50	0.087		Del Rio	0.039
Birth region in Mexico	Border	0.115	Fiscal year	Laredo	0.043
	North	0.125		Rio Grande Valley	0.104
	Center North	0.180		2008	0.282
	Center	0.198		2009	0.233
	Center South	0.314		2010	0.198
	South	0.067		2011	0.145
				2012	0.143
Number of prior apprehensions	1	0.458	Month	January	0.083
	2	0.254		February	0.102
	3	0.140		March	0.143
	4	0.077		April	0.130
	5	0.044		May	0.100
	6	0.027		June	0.077
				July	0.064
Re-apprehended	Within 3 mos.	0.206	August	0.064	
	Within 6 mos.	0.226	September	0.058	
	Within 12 mos.	0.250	October	0.075	
	Within 18 mos.	0.264	November	0.059	
			December	0.045	
Administrative consequences	Removal order	0.571	Day of week	Sunday	0.134
	Reinstatement order	0.429		Monday	0.142
	Total	344,974		Tuesday	0.149
Programmatic consequences	ATEP	0.862	Wednesday	0.149	
	MIRP	0.138	Thursday	0.149	
	Total	189,532	Friday	0.142	
Criminal consequences	Streamline	0.835	Saturday	0.135	
	Standard Prosecution	0.165	Time of day	12am-7am	0.258
	Total	85,683		7am-12pm	0.222
				12pm-6pm	0.297
				6pm-12am	0.223

Note: This table provides summary statistics on our sample of apprehensions of male Mexican nationals, ages 16 to 50, with six or fewer previous apprehensions, where the apprehension in question occurred between ports of entry along the Southwestern border between 2008 and 2012. The re-apprehension statistics are cumulative rather than mutually exclusive. For those apprehended in 2005, we track whether they had been apprehended during the 18 months back into 2003; for those apprehended in 2012, we track whether they were apprehended in the 18 months out into 2014. The full data cover 2,824,776 apprehensions of Mexican nationals between 2005 and 2012. Restricting the sample to men drops 437,618 apprehensions of women, to ages 16 to 50 drops 71,519 apprehensions of younger and older males, and to those with fewer than seven previous apprehensions drops another 102,704 apprehensions. The final sample contains 973,171 apprehensions.

Table A2: Details on CDS Rollout

Consequence Type	2008	2009	2010	2011	2012	2008-12
Administrative	0.154	0.261	0.330	0.550	0.739	0.354
Programmatic		0.148	0.167	0.393	0.492	0.195
Criminal		0.083	0.086	0.136	0.226	0.088
Programmatic or Criminal		0.229	0.249	0.510	0.680	0.273
Administrative & Programmatic		0.004	0.043	0.242	0.385	0.100
Administrative & Criminal		0.072	0.081	0.132	0.218	0.083
Administrative & Programmatic/Criminal		0.076	0.120	0.355	0.567	0.174
Any	0.154	0.414	0.458	0.705	0.852	0.454

Note: Fraction of sample apprehended migrants (male Mexican nationals, ages 16-50, with 6 or fewer prior apprehensions) subject to given consequence programs during rollout period for CDS. For programmatic consequences, the Border Patrol briefly supplemented ATEP with a second consequence, the Mexican Interior Relocation Program (MIRP), under which apprehended Mexican nationals were flown to Guadalajara or Mexico City before their release. MIRP was rolled out in 2009 and discontinued in 2011 due to its high cost. We include MIRP under programmatic consequences. In our sample, 163,440 migrants were subject to ATEP, whereas 26,092 were subject to MIRP.

Table A3: Impact of Any CDS Sanction on Probability of Re-Apprehension

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Pr(Re-Apprehension within 3 months)						
Any Consequences	-0.071 (0.004)	-0.071 (0.003)	-0.080 (0.004)	-0.079 (0.004)	-0.071 (0.004)	-0.081 (0.004)
Oster $ \delta $ Statistic			22.8	26.8		116.8
Relative to Column ...			2	2		5
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Dep. Var. Mean	0.206	0.206	0.217	0.214	0.206	0.214
R-squared	0.061	0.075	0.327	0.402	0.077	0.410
Adjusted R-squared	0.060	0.062	0.081	0.101	0.062	0.104
Panel B: Pr(Re-Apprehension within 6 months)						
Any Consequences	-0.064 (0.003)	-0.064 (0.003)	-0.072 (0.004)	-0.071 (0.004)	-0.064 (0.003)	-0.074 (0.004)
Oster $ \delta $ Statistic			23.5	2.79		118.4
Relative to Column ...			2	2		5
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Dep. Var. Mean	0.226	0.226	0.237	0.232	0.226	0.232
R-squared	0.054	0.069	0.321	0.397	0.070	0.406
Adjusted R-squared	0.054	0.055	0.074	0.094	0.056	0.098
Panel C: Pr(Re-Apprehension within 12 months)						
Any Consequences	-0.056 (0.003)	-0.056 (0.003)	-0.064 (0.003)	-0.064 (0.003)	-0.055 (0.003)	-0.066 (0.004)
Oster $ \delta $ Statistic			21.4	22.4		103.4
Relative to Column ...			2	2		5
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Dep. Var. Mean	0.250	0.250	0.261	0.256	0.250	0.255
R-squared	0.048	0.063	0.316	0.393	0.065	0.401
Adjusted R-squared	0.048	0.049	0.066	0.088	0.050	0.090
Panel D: Pr(Re-Apprehension within 18 months)						
Any Consequences	-0.052 (0.003)	-0.051 (0.003)	-0.059 (0.003)	-0.059 (0.003)	-0.051 (0.003)	-0.061 (0.004)
Oster $ \delta $ Statistic			19.8	20.7		110.5
Relative to Column ...			2	2		5
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Dep. Var. Mean	0.264	0.264	0.276	0.269	0.264	0.269
R-squared	0.046	0.061	0.314	0.391	0.062	0.399
Adjusted R-squared	0.046	0.047	0.064	0.085	0.048	0.087
<u>Interactive Fixed Effects</u>						
Sector x Fiscal Year x Month	✓	✓	✓	✓		
... x Day of Week x Time of Day		✓	✓	✓		
... x Age Category x Birth State			✓	✓		
... x Number of Prior Apprehensions				✓		
Sector x Calendar Date					✓	✓
... x Age Category x Birth State x Prior Apprehensions						✓

*Note:* This table replaces administrative consequences with any consequences (administrative, programmatic, and (or) or criminal) and re-estimates the specifications in Table 2. Coefficients and standard errors are those shown in Figure 5. Standard errors (clustered by sector-year-month) are in parentheses. (See Appendix Table A8 for p-values based on wild bootstrap standard errors.)

Table A4: Comparing Administrative and Other Consequences, 3-Month Horizon

	Dep. Var.: Pr(Re-Apprehension within 3 months)					
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Panel (A)</b>						
Admin. Conseq. (AC)	-0.060 (0.003)	-0.060 (0.003)	-0.065 (0.003)	-0.060 (0.004)	-0.063 (0.003)	-0.066 (0.004)
Program or Crim. Conseq. (PC/CC)	-0.043 (0.006)	-0.042 (0.006)	-0.059 (0.007)	-0.059 (0.007)	-0.042 (0.006)	-0.060 (0.006)
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Dep. Var. Mean	0.206	0.206	0.217	0.214	0.206	0.214
Adjusted R-squared	0.060	0.062	0.081	0.101	0.062	0.105
<b>Panel (B)</b>						
Admin. Conseq. (AC)	-0.070 (0.003)	-0.070 (0.003)	-0.075 (0.003)	-0.075 (0.003)	-0.070 (0.003)	-0.076 (0.004)
Program or Crim. Conseq. (PC/CC)	-0.059 (0.006)	-0.060 (0.006)	-0.076 (0.007)	-0.077 (0.007)	-0.058 (0.006)	-0.077 (0.006)
AC x PC/CC	0.034 (0.005)	0.036 (0.005)	0.039 (0.005)	0.043 (0.006)	0.033 (0.005)	0.039 (0.006)
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Dep. Var. Mean	0.206	0.206	0.217	0.214	0.206	0.214
Adjusted R-squared	0.061	0.062	0.081	0.101	0.063	0.105
<u>Interactive Fixed Effects</u>						
Sector x Fiscal Year x Month	✓	✓	✓	✓		
... x Day of Week x Time of Day		✓	✓	✓		
... x Age Category x Birth State			✓	✓		
... x Number of Prior Apprehensions				✓		
Sector x Calendar Date					✓	✓
... x Age Category x Birth State x Prior Apprehensions						✓

*Note:* This table reports estimates of equation (1) for the probability of re-apprehension within 3 months after the initial apprehension, allowing administrative and programmatic/criminal consequences to have different effects on recidivism in apprehensions. Panel A enters the two consequences separately; panel B allows for their interaction. Standard errors are clustered by sector-year-month.

Table A5: Comparing Administrative and Other Consequences, 18-Month Horizon

	Dep. Var.: Pr(Re-Apprehension within 18 months)					
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Panel (A)</b>						
Admin. Conseq. (AC)	-0.039 (0.003)	-0.039 (0.003)	-0.042 (0.003)	-0.043 (0.004)	-0.039 (0.003)	-0.046 (0.004)
Program or Crim. Conseq. (PC/CC)	-0.037 (0.005)	-0.036 (0.005)	-0.049 (0.006)	-0.048 (0.006)	-0.036 (0.005)	-0.050 (0.006)
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Dep. Var. Mean	0.264	0.264	0.276	0.269	0.264	0.269
Adjusted R-squared	0.046	0.047	0.064	0.085	0.048	0.088
<b>Panel (B)</b>						
Admin. Conseq. (AC)	-0.047 (0.003)	-0.047 (0.003)	-0.052 (0.003)	-0.053 (0.003)	-0.047 (0.003)	-0.055 (0.004)
Program or Crim. Conseq. (PC/CC)	-0.050 (0.006)	-0.050 (0.006)	-0.065 (0.006)	-0.065 (0.006)	-0.049 (0.006)	-0.065 (0.006)
AC x PC/CC	0.028 (0.005)	0.030 (0.005)	0.036 (0.006)	0.038 (0.006)	0.027 (0.005)	0.033 (0.006)
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Dep. Var. Mean	0.264	0.264	0.276	0.269	0.264	0.269
Adjusted R-squared	0.046	0.048	0.064	0.085	0.048	0.088
<b>Interactive Fixed Effects</b>						
Sector x Fiscal Year x Month	✓	✓	✓	✓		
... x Day of Week x Time of Day		✓	✓	✓		
... x Age Category x Birth State			✓	✓		
... x Number of Prior Apprehensions				✓		
Sector x Calendar Date					✓	✓
... x Age Category x Birth State x Prior Apprehensions						✓

*Note:* This table reports estimates of equation (1) for the probability of re-apprehension within 18 months after the initial apprehension, allowing administrative and programmatic/criminal consequences to have different effects on recidivism in apprehensions. Panel A enters the two consequences separately; panel B allows for their interaction. Standard errors are clustered by sector-year-month.

Table A6: Heterogeneous Impacts of Consequence Programs by No. of Previous Apprehensions

## (A) Administrative Consequences

	(1)	(2)	(3)	(4)
<b>Panel (A)</b>				
Pr(Re-apprehension within ... months)				
	3	6	12	18
Administrative Consequences	-0.058 (0.003)	-0.049 (0.003)	-0.043 (0.003)	-0.039 (0.003)
Administrative Consequences x 2 Prior Apprehensions	-0.025 (0.005)	-0.024 (0.005)	-0.022 (0.005)	-0.021 (0.005)
Administrative Consequences x 3 Prior Apprehensions	-0.029 (0.010)	-0.027 (0.010)	-0.015 (0.011)	-0.015 (0.011)
Administrative Consequences x 4-6 Prior Apprehensions	-0.011 (0.017)	-0.007 (0.018)	-0.000 (0.018)	0.009 (0.020)
Number of Observations	512,727	512,727	512,727	512,727
Dep. Var. Mean	0.214	0.214	0.214	0.214
R-squared	0.401	0.396	0.392	0.391
Adjusted R-squared	0.099	0.092	0.086	0.084

## (B) Any Consequences

<b>Panel (B)</b>				
Pr(Re-apprehension within ... months)				
	3	6	12	18
Any Consequences	-0.074 (0.004)	-0.067 (0.004)	-0.060 (0.004)	-0.056 (0.004)
Any Consequences x 2 Prior Apprehensions	-0.024 (0.005)	-0.022 (0.006)	-0.019 (0.006)	-0.019 (0.006)
Any Consequences x 3 Prior Apprehensions	-0.019 (0.009)	-0.014 (0.009)	-0.002 (0.010)	-0.001 (0.011)
Any Consequences x 4-6 Prior Apprehensions	-0.004 (0.018)	-0.003 (0.019)	0.003 (0.019)	0.011 (0.020)
Number of Observations	512,727	512,727	512,727	512,727
Dep. Var. Mean	0.214	0.214	0.214	0.214
R-squared	0.402	0.397	0.393	0.391
Adjusted R-squared	0.101	0.094	0.088	0.085
<b>Interactive Fixed Effects</b>				
Sector x Fiscal Year x Month	✓	✓	✓	✓
... x Day of Week x Time of Day	✓	✓	✓	✓
... x Age Category x Birth State	✓	✓	✓	✓
... x Number of Prior Apprehensions	✓	✓	✓	✓

*Note:* This table reports estimates of the regressions in column 4 of Table 2, shown in panel A, and in column 4 of Table A3, shown in panel B, in which we allow the impact of consequence programs on the probability of re-apprehension to vary with the number of previous apprehensions for an individual. Standard errors are clustered by sector-year-month.

Table A7: Impact of Administrative Consequences on Probability of Re-Apprehension (p-values based on wild bootstrap)

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Pr(Re-Apprehension within 3 months)						
Administrative Consequences	-0.064 [0.010]	-0.063 [0.014]	-0.065 [0.022]	-0.063 [0.015]	-0.064 [0.011]	-0.066 [0.005]
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Panel B: Pr(Re-Apprehension within 6 months)						
Administrative Consequences	-0.055 [0.019]	-0.054 [0.020]	-0.055 [0.048]	-0.054 [0.036]	-0.055 [0.020]	-0.058 [0.013]
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Panel C: Pr(Re-Apprehension within 12 months)						
Administrative Consequences	-0.047 [0.025]	-0.046 [0.033]	-0.047 [0.083]	-0.047 [0.063]	-0.047 [0.032]	-0.050 [0.046]
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Panel D: Pr(Re-Apprehension within 18 months)						
Administrative Consequences	-0.042 [0.035]	-0.041 [0.042]	-0.042 [0.098]	-0.043 [0.068]	-0.042 [0.039]	-0.046 [0.054]
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
<u>Interactive Fixed Effects</u>						
Sector x Fiscal Year x Month	✓	✓	✓	✓		
... x Day of Week x Time of Day		✓	✓	✓		
... x Age Category x Birth State			✓	✓		
... x Number of Prior Apprehensions				✓		
Sector x Calendar Date					✓	✓
... x Age Category x Birth State x Prior Apprehensions						✓

*Note:* This table replicates Table 2, showing within brackets the p-values based on a wild bootstrap procedure clustering at the sector level (of which there are 9).

Table A8: Impact of Any Consequences on Probability of Re-Apprehension (p-values based on wild bootstrap)

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Pr(Re-Apprehension within 3 months)						
Any Consequences	-0.071 [0.009]	-0.071 [0.009]	-0.080 [0.028]	-0.079 [0.028]	-0.071 [0.009]	-0.081 [0.034]
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Panel B: Pr(Re-Apprehension within 6 months)						
Any Consequences	-0.064 [0.008]	-0.064 [0.006]	-0.072 [0.023]	-0.071 [0.024]	-0.064 [0.007]	-0.074 [0.034]
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Panel C: Pr(Re-Apprehension within 12 months)						
Any Consequences	-0.056 [0.005]	-0.056 [0.005]	-0.064 [0.014]	-0.064 [0.014]	-0.055 [0.004]	-0.066 [0.032]
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
Panel D: Pr(Re-Apprehension within 18 months)						
Any Consequences	-0.052 [0.005]	-0.051 [0.004]	-0.059 [0.012]	-0.059 [0.019]	-0.051 [0.004]	-0.061 [0.028]
Number of Observations	973,171	972,754	713,528	512,727	972,721	495,668
<u>Interactive Fixed Effects</u>						
Sector x Fiscal Year x Month	✓	✓	✓	✓		
... x Day of Week x Time of Day		✓	✓	✓		
... x Age Category x Birth State			✓	✓		
... x Number of Prior Apprehensions				✓		
Sector x Calendar Date					✓	✓
... x Age Category x Birth State x Prior Apprehensions						✓

Note: This table replicates Appendix Table A3, showing within brackets the p-values based on a wild bootstrap procedure clustering at the sector level (of which there are 9).

## Appendix B: Estimating Capacity Constraints in Figure 3

In Section 2.3, we discuss the results in Figure 3 demonstrating the staffing constraints in moving from voluntary return to administrative consequences under the CDS. For each Border Patrol sector  $s$ , we compute the share of officer time that would be absorbed by applying AC to all apprehended migrants on a given day  $d$  from 2008 to 2012 based on the equation:

$$agent\ time_{sd} = 100 \times \left[ \frac{(1.5 - 0.25) \times (0.92 \times apprehensions_{sd})}{(agents_{sd} - (0.8 \times agents_{s,2007})) \times 8 \times 0.51 \times 0.916} \right] \quad (4)$$

where  $(1.5-0.25)$  captures the increase in agent man-hours to go from processing one VR to processing one AC; 0.92 is the share of apprehensions that were not already subject to AC as of 2008 (i.e., 92% of migrants received VR in 2007);  $(agents_{sd} - (0.8 \times agents_{s,2007}))$  is agent time available after subtracting the fraction needed for essential operations (e.g., patrolling the border, making apprehensions) which is set to 80% of the level of 2007 agent activities; 8 is the number of potential hours available per agent per day; 0.51 is the fraction of each hour that agents work in operations after accounting for reported time not on duty, on breaks, in training, or performing administrative tasks; and 0.916 is the fraction of operations time not spent on traffic checkpoints (which occur relatively far from the border itself, impeding agents who man check points from performing other duties). These parameter values in equation (4) are based on an in-depth analysis by the U.S. Government Accountability Office of time use by Border Patrol agents along the U.S.-Mexico border in the early 2010s (GAO, 2017b). Figure 3 plots the resulting variation using sector–day observations on the total number of apprehensions, and sector–year observations on the total number of agents. Note that the number of apprehensions used in equation (4) is based on our sample and, hence, likely understates demands on agent time, as it excludes minors, serious criminals, and non-Mexican nationals, which account for 15% of total apprehensions during 2008-2012.