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RED SCARE? A STUDY OF ETHNIC PREJUDICE IN THE PROSECUTIONS UNDER THE ECONOMIC ESPIONAGE ACT

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ABSTRACT

We empirically test whether the Department of Justice (DOJ) engages in ethnic prejudice against Chinese in its prosecutorial decisions under the Economic Espionage Act (EEA) of 1996. Using data of EEA cases from November 1996 to June 2021, we conduct Becker's outcome test for evidence of ethnic prejudice. We find that Chinese-named defendants were more likely to be dismissed by trial or acquitted by jury, and were found guilty on fewer counts, and on average received harsher indictments. These results are robust regardless of whether we consider all cases or only arguably ``marginal" cases. We also find that, for those publicly listed victim firms whose trade secrets were allegedly stolen by the charged defendants, the stock market reaction was much more muted to the news on the case filing date if the charged defendants are of Chinese descent. Our study provides the first systematic evidence that the DOJ's prosecutorial decisions in the application of the EEA may have been tainted by ethnic prejudice against Chinese, including American citizens of Chinese descent.

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> "*We must reject xenophobic attempts to broadly target Chinese and Chinese Americans en masse as unique national security threats... Racial profiling does not protect U.S. interests. It promotes hysteria and has led to arrests of innocent individuals where charges were later dropped without any explanation.*"
> Rep. Judy Chu (CA) and Rep. Jamie Raskin (MD), February 25, 2020.

1 Introduction

The Economic Espionage Act (EEA) was signed into law by President Clinton on October 11, 1996. Before EEA, US companies could only remedy trade secrets theft through civil lawsuits; EEA represented a seismic shift: it was the first time in American history that attacks on American business were branded as a national security threat. The act created two new federal crimes related to the theft of trade secrets, respectively cited under Section 1831 and Section 1832 of the EEA.[1] Section 1831 is directed against foreign countries. It provides more severe penalties if the offender had intent to benefit a foreign government, foreign company, or foreign agent by stealing trade secrets. Section 1832, Theft of Trade Secrets, is more general and it "makes it illegal for a person to, among other things, possess a stolen trade secret with the intent to convert that trade secret to the economic benefit of anyone other than the owner thereof" (Edelman, 2010).

When EEA was signed into law in 1996, American policymakers were particularly concerned about France, whose secret service chief was blunt about his interest in obtaining American economic secrets (Hvistendahl, 2020). The target of the law, however, gradually shifted to China as Americans become more worried about Chinese spying. President Barack Obama in 2013 pledged that the Department of Justice (DOJ) would do more to combat the threat of Chinese espionage (Sanger, 2013). The proportion of Chinese defendants charged under the EEA has risen dramatically under the Obama administration, from 17% before 2009 to over 50% thereafter (Kim, 2018). On November 1, 2018, amid rising tensions with China and the growing concerns about the Chinese economic espionage, the DOJ under the Trump administration launched the "China Initiative", which "focused on preventing and prosecuting thefts of American technology and intellectual property for the benefit of China." In a press release on August 4, 2020, DOJ announced that about 80 percent of all of its economic espionage prosecutions alleged conduct that would benefit the Chinese state, and there was at least some nexus to China in around 60 percent of all trade secret theft cases.[2]

[1] The EEA consists of eight subsections, §1831-1839, prosecuting cases of economic espionage under Section 1831 and Section 1832. A full representation of Section 1831 and 1832 of the Economic Espionage Act of 1996 can be found in Appendix A.

[2] https://www.justice.gov/opa/information-about-department-justice-s-china-initiative-

As the number of cases involving Chinese defendants increases dramatically, there are also growing concerns of ethnic prejudice. While Chinese Americans represent only 1.5% of the US population, they now account for more than one third of the defendants ever charged under the EEA; and in recent year, the fraction was over 50%. It is also worth noting that a number of cases has been dropped in the end without sufficient evidence to prove the guilt of the defendants.[3][4] As more dropped cases against Chinese defendants are reported, concerns are raised over the prosecutions of innocent Asian Americans and potential ethnic prejudice by the FBI. Two House Democrats, Rep. Judy Chu of California and Rep. Jamie Raskin of Maryland, launched an investigation into the FBI's handling of Chinese espionage and intellectual property theft cases in early 2020. In their words, while there's "no doubt" that the U.S. must protect against economic espionage and threats to innovation and security, "we must reject xenophobic attempts to broadly target Chinese and Chinese Americans en masse as unique national security threats... Racial profiling does not protect U.S. interests. It promotes hysteria and has led to arrests of innocent individuals where charges were later dropped without any explanation."[5]

There has been extensive research on racial disparities in law enforcement and legal practice. For example, Knowles et al. (2001) and Anwar and Fang (2006) test the presence of racial prejudice in highway searchers; Anwar et al. (2012) study the role of jury's races in sentencing outcomes; Arnold et al. (2018) study the racial biases in bail decisions; Mustard (2001), Fischman and Schanzenbach (2012), and Ulmer et al. (2011) examine the racial, ethnic, and gender disparities in sentencing; Alesina and Ferrara (2014) test the role of racial prejudice in capital sentencing; Shermer and Johnson (2010) studies the racial disparities in plea bargaining; and Anwar and Fang (2015) tests for racial prejudice in the parole board's release process, among others. Relatively little attention has been given to racial disparities in prosecutorial choices. One exception is Rehavi and Starr (2014), which systematically studies racial disparities in the prosecution process and its effect on the sentencing outcomes. However, they have mainly focused on documenting racial disparities in the prosecution phase, while we examine the role of ethnic prejudice in the prosecutors' charging decisions

and-compilation-china-related

[3]For an example, see https://dailyprogress.com/news/uva/charges-dropped-against-chinese-researcher-accused-of-stealing-uva-trade-secrets/article_c3bf50e5-74ae-5c6f-9fc3-548639317249.html

[4]We should note that EEA is only one of the many statutes under which Chinese scientists have been indicted. Some of the most prominent cases involving Chinese scientists were not charged under the EEA. As one of the most prominent example, Dr. Xiaoxing Xi, a Temple University physicist accused of sharing sensitive technology with China, was charged under 18 U.S.C. 1343 (wire fraud, four counts), 18 U.S.C. 2 (aiding and abetting), and 18 U.S.C. 981(a)(1)(c) (notice of forfeiture). All charges against Dr. Xi were later dropped. See https://www.nytimes.com/2015/09/12/us/politics/us-drops-charges-that-professor-shared-technology-with-china.html.

[5]https://www.nbcnews.com/news/asian-america/democratic-lawmakers-launch-investigation-fbi-handling-chinese-espionage-n1142161

in the application of the EEA.

In addition, most existing literature focuses on the racial disparities (e.g. Berdejó (2018), Mayson (2018),Yang (2015), etc.) or the gender disparities (e.g. Starr (2015), Kim et al. (2019), etc.), while studies on ethnic prejudice against Asian Americans remain scant. Lewis (2020) studies the "China Initiative", and argues that the use of "China" as a frame is incongruent with DOJ's own principles. She further contends that any implication that part of the justification for prosecution and resulting punishment is the defendant's shared connection to China is worrisome when assessed in light of the goals of deterrence, incapacitation, rehabilitation, and retribution. To the best of our knowledge, Kim (2018) is the first and only empirical paper studying ethnic disparities in DOJ prosecutions for economic espionage. Based on data of 103 cases charged under EEA compiled from PACER, he shows the presence of significant disparities in the rates at which people of Asian descent are prosecuted for espionage and the outcomes of those prosecutions. However he did not aim to distinguish the role of prosecutors' ethnic prejudice from statistical discrimination (i.e., the possibility that Chinese-Americans commit more espionage and are thus prosecuted more often).

While it is vital to protect the US business against the theft of trade secrets, it is also critical, as Rep. Chu and Raskin emphasized, that the laws are equally applied without any prejudice against one's race, gender, ethnicity, or country of origin. In fact, ethnic prejudice the application of the EEA not only is antithetical to American values, but also diminishes the effectiveness in protecting American trade secrets and innovations. Thus, understanding the causes of the ethnic disparities in the DOJ's prosecutorial process is at least as important in the EEA setting as in other legal settings that have attracted more academic attention. As mentioned earlier, the two major possible causes for the ethnic disparities in the prosecutorial decisions by the DOJ are statistical discrimination and ethnic prejudice. Different causes for the ethnic disparities call for different policy responses. If ethnic differences in crime prevalence are the reason for the disparities in the charging rates, it will justify the DOJ's extensive focus on Chinese suspects in its investigation effort. However, if prejudice is to blame for the ethnic disparities in charging rates, then we should identify, inform, and if necessary, even replace the prejudiced agents to reduce the disparities, which at the same time can increase the effectiveness in the protection of US trade secrets. This paper contributes to the literature by providing systematic evidence on the presence of ethnic prejudice in the DOJ's prosecutorial decisions in its applications of the EEA.

Specifically, in this paper we empirically test whether the federal prosecutors engage in ethnic prejudice against Chinese-named defendants. With a comprehensive hand-collected dataset of 253 EEA cases, which involve 419 defendants from November 1996 to June 2021, we conduct the *outcome* test, which is based on the following simple idea: if federal prosecutors engage in ethnic prejudice against Chinese defendants, the cases against Chinese defendants

will have higher probabilities of being dismissed in court or acquitted by jury.[6] Our test for ethnic prejudice is based on a simple model of prosecutors' behavior, due to Knowles et al. (2001), which provides a theoretical basis for using the *average conviction rate* (or equivalently, the *average dismissal rate*) as the basis of test for ethnic prejudice of the federal prosecutors. We find that Chinese-named defendants were more likely to be dismissed by trial or acquitted by jury, were found guilty of fewer counts, but on average received harsher indictments. These results are robust regardless of whether we consider all cases or only arguably "marginal" cases. We also find that, for those publicly listed victim firms whose trade secrets were allegedly stolen by the charged defendants, the stock market reaction was much more muted to the news on the case filing date if the charged defendants are of Chinese descent. This suggests that the market perceives the DOJ's public disclosure of an alleged trade secret theft of the victim firm to be much less consequential if the alleged defendants are Chinese descent. Summarizing the plethora of evidence, our study provides the first systematic evidence that the DOJ's prosecutorial decisions in the application of the EEA may have been tainted by ethnic prejudice against Chinese, including American citizens of Chinese descent.

The remainder of the paper is structured as follows. In Section 2, we describe the data sets used in our analysis. In Section 3, we discuss the empirical challenges and our research design. In Section 4, we present our empirical results. In Section 5, we conclude.

2 Data Sets and Descriptive Statistics

2.1 Data Sets

Our primary data source is the court documents drawn from the Public Access to Court Electronic Records (PACER) database.[7] We search for all cases in the PACER system that included EEA charges (18 U.S.C. §1831 and §1832), between October 11, 1996, when the EEA was enacted, through June 30, 2021. Each of the 94 federal district courts has its own Electronic Case Files website; among them 92 allow searches for cases by charging statutes, and the other two, the Central District of California and the Northern District of Ohio, do not. Cases from these two districts are thus excluded. This yields 210 cases involving 309 individual defendants and 33 corporate defendants.

Unfortunately, PACER does not document all cases that are filed in federal district

[6] The outcome test originated in Becker (1957). Becker (1993b,a) further elaborated on this idea and Ayres (2001) presented several interesting applications. See also Knowles et al. (2001) and Anwar and Fang (2006) for applications of the outcome test in racial profiling in motor vehicle searches.

[7] www.pacer.gov

courts.[8] In order to be as comprehensive as possible in our coverage, we further supplement cases that were addressed in U.S. Attorney press releases.[9] This yields 43 more cases involving 75 individual defendants and 2 corporate defendants. Thus in total, we have 253 cases involving 384 individual defendants and 35 corporate defendants.

Remark 1 It should be noted that U.S. Attorneys do not publish a press release for every case they file; rather, they are likely to issue press releases for cases they believe might be of particular interest to the public or may be significant for the DOJ goals. Following the "China Initiative" launched on November 1, 2018, we may expect that U.S. Attorneys are more incentivized to publish press releases in cases that could be labeled "Chinese espionage" than do in other cases. Therefore, including cases from the press release may lead to a selection bias by over representing the cases related to China. Thus we also conduct our analysis using only PACER data, which is reported in the the appendix; our results are robust to using only the PACER sample.

As we are interested in the DOJ's prejudice against Chinese, we need to code the ethnicity of each defendant. We first follow Kim (2018) to use the defendants' names to identify the likely ethnicity of each defendant. In particular, we code defendants' names into "Western," including US, Canada, and European (both western and eastern European, including Russia); "Chinese;" "Other Asian," including Indian names; "Hispanic;" and "Arabic," based on the totality of the first, middle, and last names. For names that could be of ambiguous origin, we search DOJ press releases and other news coverage about the specific defendants and individual cases, which often revealed the ethnicity of the person in question.

Remark 2 One may argue that coding the defendants' ethnicities from last names is subject to several limitations, particularly due to adoptions and marriages, which may change the defendants' last names from the ones at birth. Moreover, the federal prosecutors and the US Attorneys may rush to file charges against some foreign nationals considering the risk that continuing the investigation could allow the suspect to flee the country. In order to distinguish between citizens and non-citizens, we further read into PACER documents such as the FBI complaint reports, case summaries, and sentencing memorandums, etc., from which we are able to code the nationality of each defendant. So we are able to distinguish between Chinese Americans and Chinese citizens.

For each defendant, we then code the following variables from court documents: the

[8] See Kim (2018) for a detailed discussion of the reason.
[9] https://www.justice.gov/news

district court where the case was filed; the dates of when the case was filed and closed; the defendant's name; the victim firm whose trade secrets were allegedly stolen by the defendant(s); the allegedly benefiting country; the citations used to indict the defendant; whether the defendant pleaded guilty or not; and the outcome and the disposition of the defendant. As for outcome, we code it into a categorical variable with 8 values: 1 = the defendant pleaded guilty to EEA related charges (i.e. 18 U.S.C. §1831 or 18 U.S.C. §1832); 2 = the defendant pleaded guilty to non-EEA related charges; 3 = the defendant was found guilty by court or by jury on EEA related charges; 4 = the defendant was found guilty by court or by jury on non-EEA related charges only; 5 = the case was dismissed by court or acquitted by jury; 6 = the defendant went fugitive; 7 = the case is still pending at the time of data collection; 8 = the defendant died or committed suicide. If the defendant pleaded guilty or was found guilty, we also code the disposition of the defendant in the final judgment; in particular, we code whether the defendant was sentenced to imprisonment or probation, the length of probation and imprisonment, the amount of restitution and fine imposed, etc.

Lastly, we are also interested in comparing the US Attorney's behavior in filing indictments against the Chinese defendants with that against other defendants. We code the number of counts each defendant was indicted on, as well as the number of counts on which the defendant was found to be guilty of. In Criminal Procedure, one count is one of several parts or charges of an indictment, each accusing the defendant of a distinct and separate offense. In particular, we separately code the number of counts the defendant has been indicted on in four categories: (1) counts under 18 U.S.C. §1831; (2) counts under 18 U.S.C. §1832; (3) counts of other citations; and (4) false statements separately. We also code the number of counts the defendant is found guilty of according to these four categories.

2.2 Descriptive Statistics

2.2.1 Benefiting Country and Defendants' Ethnicity

Figure 1 plots the number of cases in Panel (a) and the number of defendants in Panel (b) charged under EEA U.S.C. §1831 and/or §1832 by year for the period of 1996 to 2021. It shows that the number of cases filed under EEA indeed increased under the Obama administration, and there are now around 10 to 15 cases filed each year.

[Figure 1 about here]

In Table 1 we report the case level distribution of the benefiting country, first for the full sample, and then separately for the PACER sample and the press release sample. It shows that for the full sample around 51% of the cases benefit domestic US firms, and 36% of the cases allegedly benefit China, while the remaining 13% of the cases benefit countries other

than US and China. Moreover, it shows that the press release sample indeed contains more cases related to China (46%) compared to the PACER sample (33%). However, this does not necessarily imply that the press release sample has a selection bias because the press release mainly covers cases from 2014, and the cases related to China started to increase dramatically since 2010. As a result, the higher percentage of China-related cases in the press release sample may also be due to the fact that the press release sample mainly covers the period when there are actually higher percentage of China-related cases. To minimize the risk of selection bias, in our empirical analysis, we conduct robustness checks using PACER sample only.

[Table 1 about here]

In Table 2, we report the distribution of the defendants' ethnicity, first for the full sample, and then separately for the PACER sample and the press release sample. It shows that westerners and Chinese are the two major ethnicity groups, each accounting for about 40% of the full sample. However, it is worth noting that the press release sample indeed has significantly higher percentage of defendants with Chinese name, with 60% of the defendants identified as Chinese and only 26% of the defendants identified as westerner, in contrast to the 32% of defendants with Chinese name and 44% of defendants with western name in the PACER sample.

[Table 2 about here]

In Table 3, we report the distribution of the defendants' ethnicity separately for different benefiting countries. Most Chinese-named defendants are involved in the cases that allegedly benefit China. For the cases that relate to China, 137 (75%) of the defendants are Chinese, 17 (9%) are westerners, and the other 29 (16%) are of other ethnicities. For the cases that benefit US, only 19 (10%) of the defendants are Chinese, the majority, 132 (72%) of them are westerners, and the other 35 (18%) are of other ethnicities.

[Table 3 about here]

Table 5 presents the distribution of the defendants' ethnicities for three time periods: 1996-2008, 2008-2015 (Obama Administration), and 2016-Present (Trump Administration). It shows that the proportion of Chinese-named defendants charged under the EEA has risen dramatically since the Obama administration. While only around 20% of defendants charged between 1996 and 2008 were Chinese, since 2009 more than 50% of all EEA defendants have been Chinese. On the other hand, the proportion of western-named defendants has dropped from 60% before 2009 to around 30% afterwards. The proportion of defendants with other ethnicities has remained stable over time, accounting for about 20% all together.

[Table 5 about here]

In Table 4, we report the distribution of the defendants' citizenship, separately for each ethnicity group. It shows that among the 159 Chinese-named defendants, 57 (36%) are US citizens, and the ratio is similar (34%) for other Asian-named defendants. Among the 180 western-named defendants, 159 (88%) are US citizens and the other 11 (6%) are not.

[Table 4 about here]

2.2.2 Case Outcomes

In Table 6 we report the summary statistics for case outcomes using the defendant level observations. Of the 419 unique defendants in our full sample, the cases of 314 defendants, accounting for 75%, were closed by June 2021; 33 (accounting for 8%) of the defendants were listed as fugitives; 68 (16%) were still pending; and 4 were listed as others. Among the 314 defendants whose cases were terminated, a total of 207 (68%) pleaded guilty, among whom 165 pleaded guilty on at least one EEA-related charges and 42 on non-EEA related charges only; 38 (12%) were convicted on trial or by jury, among whom 32 were convicted on at least one EEA-related charges and 6 on non-EEA related charges only. In total, 190 of the 314 defendants whose cases were closed (60%) were found guilty on at least one EEA-related charges. The rates are lower for Chinese defendants: among the 99 defendants whose cases were closed, 56 (56%) pleaded guilty, 13 (13%) were convicted on trial or by jury, and 55 (51%) were proved guilty to EEA-related charges. Moreover, conditional on the case being terminated, the dismissal rate is much higher for Chinese defendants ($30/99 = 30.3\%$) compared to defendants with other ethnicities ($39/215 = 18.1\%$). However, among the 33 fugitive defendants, 24 (72.7%) of them are Chinese, much higher than the proportion of Chinese defendants in the full sample.

[Table 6 about here]

Remark 3 The defendant being fugitive does not necessarily imply that they are guilty and want to evade punishment. It can actually be a rational response to the perceived disparity in treatment against Chinese defendants. For example, a case was filed in New Jersey in 2001 against three men accused of stealing sophisticated computer software developed by Lucent Technologies for handling voice calls over the Internet.[10] The program, called PathStar, was reportedly generating $100 million in annual sales for Lucent shortly before the alleged theft. One of the defendants, Hai Lin, jumped bail in 2004 and, according to the prosecutors, has probably returned to China. One year later, the charges against the

[10] See https://www.nysun.com/national/spy-charges-in-high-stakes-microchip-race/34620/

other two defendants, Kai Xu and Yong-Qing Cheng, were dropped. For another example, on April 9, 2008, Ellen Chen Yeh, a former Texas Instruments employee, was indicted on a number of counts including misappropriation of trade secrets and other serious crimes.[11] Yeh stayed in China until August 2013, when Yeh returned to the U.S. to face trial after she was detained at the South Korean border in response to a "Red Notice" issued by Interpol at the U.S. government's request. On March 14, 2014, after a nine day trial, the jury acquitted Ms. Yeh on all counts.

In Table 7 we report the summary statistics for the defendants' punishment if the defendant was found guilty of at least one count of indictment. It shows that Chinese-named defendants received much harsher punishment for their crimes than do defendants with Western names. In particular, 22% of the convicted Chinese defendants received only probation, while 46% of the convicted defendants with other ethnicities received sentences of only probation. Moreover, the average sentence for Chinese named defendants convicted of espionage or other serious crimes was 37.1 months, compared with the average sentence of 24.7 months for other defendants. The average length of probation for the two groups does not show a big difference: Chinese defendants on average received 34.8 months of probation, and other defendants on average received 35.6 months of probation. Interestingly the assessed restitution and fine to the victim firm against guilty Chinese-named defendants is smaller than that assessed against guilty defendants of other ethnicities, though the standard deviations of the restitution and fines are very large.

[Table 7 about here]

2.2.3 Indictment

In Table 8 we report the summary statistics for the number of counts the defendants were indicted on and were later found guilty of. In Panel A we report the statistics for the full sample. Among the 419 defendants, 49 were indicted on 18 U.S.C. §1831 and 393 were indicted on 18 U.S.C. §1832. 204 defendants were also indicted on other serious crimes such as 18 U.S. Code §371 (Conspiracy to commit offense or to defraud United States), 18 U.S. Code §1030 (Fraud and related activity in connection with computers), 18 U.S. Code §1343 (Fraud by wire, radio, or television), etc. In addition, 18 defendants were indicted on false statement charges.

In Panel B of Table 8 we restrict our sample to the defendants whose cases were closed and report the summary statistics for the number of counts for Chinese defendants and defendants in other ethnic groups separately. It shows that Chinese-named defendants were

[11] See https://www.lexology.com/library/detail.aspx?g=a9f50827-4c62-496c-bf6f-f5e358b755a6

on average indicted on more counts, but were found guilty on fewer counts compared to other defendants. Chinese-named defendants were on average indicted on 4.4 counts under Code 1832 but were found guilty on only 0.98 counts, compared with an average of 2.6 counts indicted but 0.95 counts guilty for defendants in other ethnic groups. 57 (57%) of the Chinese defendants were indicted on other serious crimes together, with an average of 6.4 counts, and 10 (10%) were indicted together with false statement; in contrast, only 90 (42%) of defendants with other ethnicities were indicted together with other serious crimes, with an average of 6.2 counts, and 7 (3%) were indicted together with false statement. On the other hand, Chinese defendants were found guilty on an average of 0.7 counts of other serious crimes and of 1 counts of false statement; in contrast, for defendants with other ethnicities they were found guilty on average on 1.4 counts of serious crimes and 1.1 count of false statement.

[Table 8 about here]

One may wonder whether the difference in federal prosecutors' indictment behavior against defendants of different ethnicities is due to ethnicity or citizenship, as more than half of the Chinese defendants are not US citizens. Table 9 reports the summary statistics for the number of counts the defendants were being indicted on and were found guilty of for Chinese Americans, citizens with other ethnicities, and Chinese nationals separately. Column (7) and (8) compare Chinese Americans and citizens in other ethnic groups. It shows that Chinese American defendants were indicted on 2.4 *more* counts under EEA U.S.C §1832. On the other hand, Chinese Americans and defendants in other ethnic groups were found guilty on similar, at least with no statistically significant difference, number of counts. Columns (9) and (10) compare defendants who are Chinese Americans with those who are Chinese nationals. It shows that Chinese Americans were indicted on similar number of counts under EEA U.S.C. §1831 but were found guilty on *fewer* of them; and they were indicted under 1.4 *more* counts on EEA U.S.C §1832 but were found guilty on similar counts. These suggest that citizenship does not give Chinese Americans any advantage in the DOJ's prosecutorial decisions in the application of the EEA. Overall, Table 9 suggests that the defendants' ethnicity rather than citizenship drives the difference in the federal prosecutors' indictment behavior.

[Table 9 about here]

3 The Empirical Test

In this section, we first describe the empirical challenges in testing for the ethnic prejudice against Chinese-named defendants and discuss our empirical strategies to address them, and

then present a simple model that serves the basis of our empirical strategy.

3.1 Empirical Challenge and Strategy

As shown in the previous section, there has been a significant increase in the number and the fraction of cases filed against Chinese defendants in recent years. Moreover, Chinese defendants were indicted on more counts than their westerner counterparts. However, an *action*-based test by comparing whether Chinese defendants represented a greater proportion of the DOJ's application of the EEA charge or received more indictment counts than their counterparts with westerner names may not be considered as direct evidence of ethnic prejudice against Chinese-named defendants. It is well known that evidence based on such ethnic disparities in these *action*-based tests can be subject to *omitted-variable bias*, which occurs when there are systematic differences across ethnic groups in the defendants' characteristics that are observable to and used by the DOJ and US Attorneys in their investigation and charging decisions but that are unobserved by researchers. These disparities can also arise from *statistical discrimination* when there is crucial information about the guilty rates of the defendants that is unobservable to the federal prosecutors but is correlated with the defendants' ethnicities; for example, the prosecutors may believe that the Chinese defendants are more likely to be engaged in economic espionage. Under such circumstances the prosecutors may use ethnicity of the potential defendants as a proxy for such unobserved guilty propensity in their charging decisions.

To deal with these issues, we use an *outcome*-based test because, if applied properly, such tests can distinguish ethnic prejudice from statistical discrimination even in the presence of omitted variables, as ethnic prejudice and statistical discrimination will have a different impact on the outcome in question. In the context of the DOJ's prosecution under the EEA, the outcome test is based on the following intuitive notion: if the federal prosecutors are profiling Chinese suspects due to ethnic prejudice, they will investigate and charge Chinese even when the returns from charging them, i.e., the probabilities of successful convictions against Chinese, are smaller than those from charging non-Chinese defendants. Thus, *assuming that the court's decisions are unbiased*, the cases with Chinese defendants will have higher probabilities of being dismissed in court or acquitted by jury. Note that, if the court is also biased against Chinese-named defendants, then finding evidence of higher dismissal rates against Chinese-named defendants provides even stronger evidence of the DOJ's ethnic prejudice. More specifically, it is very costly for the DOJ to initiate a EEA-related case. There are many factors that discourage parties from pursuing an EEA claim, such as the higher burden of proof necessary to criminally convict under the EEA, the possibility of a lengthy grand jury investigation, and the lack of monetary damages, etc. (Orozco (2012)). Therefore the DOJ will only be willing to initiate a case unless it perceives enough benefit and evidence to

merit criminal investigation and prosecution. If the DOJ engages in ethnic prejudice against Chinese, it either holds unwarranted higher beliefs that a Chinese defendant is guilty, or incurs lower psychological costs against prosecuting a Chinese-named defendant. Thus it will use a lower threshold for Chinese defendants in its application of EEA related codes and will more likely to charge a Chinese defendant with weaker or insufficient evidence. As a result, the cases against Chinese defendants are less likely to result in guilty verdict, or equivalently, more likely to be dismissed by the court, based on the federal prosecutors' evidence.

The second empirical challenge is the well known *infra-marginality* problem that arises when one implements the outcome tests. The inframarginality problem refers to the difference between the comparisons of the average and marginal outcomes across racial or gender groups.[12] The idea of outcome test described above is based on the comparison of the *marginal* dismissal rates across ethnic groups: if the FBI does not engage in ethnic prejudice, we should expect the same threshold of applying EEA codes and thus the same *marginal* dismissal rate across defendants of different ethnicities. Thus, to implement our outcome test for ethnic prejudice we need to identify the marginal dismissal rates across defendants of different ethnicities; however, empirically we can only observe the average dismissal rates by ethnic groups, instead of the marginal dismissal rate. When the underlying distributions for the two groups are different, we cannot determine the relationship between the marginal dismissal rates of Chinese and western defendants by looking at average dismissal rates, an issue known as the *infra-marginality* problem (see, e.g., Anwar and Fang, 2006).

We take a two-pronged approach to address the infra-marginality problem. First, we present in Section 3.2 a simple model of the federal prosecutors' behavior, due to Knowles et al. (2001), which provides a theoretical basis for using the *average* conviction rate, or equivalently the *average* dismiss rate, as the basis of test for ethnic prejudice of the FBI agents. Our test for ethnic prejudice is mainly based on the model, and as such, evidence for or against ethnic prejudice using our test is only as credible as our proposed model. However, we show in Appendix B in a model where the infra-marginality problem may reappear under more generalized setting, thus our second approach is to identify a set of cases that represents arguably the "marginal cases" and compare the differences in outcomes across defendants of different ethnicities among these marginal cases (see Section 4.2).

3.2 A Simple Model without the Inframarginality Problem

We now present a model, due to Knowles et al. (2001), that provides a theoretical basis for using the average conviction rate, or equivalently the average dismissal rate, as the

[12] See Ross and Yinger (2002)[Chapter 8], Ayres (2001) and Anwar and Fang (2006) for detailed discussions of the infra-marginality problem in the context of mortgage lending, police practices and motor vehicle searches, respectively.

basis of test for ethnic prejudice of the federal prosecutors. Consider an environment with potential spies from two ethnicities, denoted by $r \in \{C, W\}$ where C stands for "Chinese" and W for "Westerner". The ethnicity of the suspect is observable by the federal prosecutors. Besides ethnicity r, the potential spies also have other characteristics s, which include all the characteristics other than race that are potentially used by the federal prosecutors in deciding whether to prosecute a suspect. Note that, while s is observed by the federal prosecutors, researchers may observe a subset or none of s. Assume that s is distributed in the population according to $F(s|C)$ and $F(s|W)$, respectively.

The key to Knowles et al. (2001) model is that the potential spies and the federal prosecutors make spying and prosecution decisions simultaneously to reach an equilibrium. Specifically, a potential spy of characteristics (s, r) chooses to whether or not to engage in economic espionage. If he spies, his payoff is $v(s, r)$ if he is not prosecuted by the federal prosecutor, and $-j(s, r)$ if he is prosecuted. Federal prosecutors, on the other hand, decide whether to prosecute a potential spy of characteristics (s, r) to maximize the total number of convictions minus a prosecution cost. It is without loss of generality to normalize the benefit of each conviction (or guilty plea) to 1, and let the cost of prosecuting a western suspect be $t_W \in (0, 1)$ and that of prosecuting a Chinese be $t_C \in (0, 1)$. We say that the federal prosecutor is *ethnically prejudiced against Chinese* if $t_C < t_W$.

The potential spies of characteristics (s, r) and the federal prosecutors play the following game akin to a "matching pennies" game:

	Spy	Not Spy
Prosecute	$1 - t_r, -j(s, r)$	$-t_r, 0$
Not Prosecute	$0, v(s, r)$	$0, 0$

It is straightforward to show that the unique equilibrium of the above "matching pennies" game is in mixed strategies described below:

Proposition 1 *The unique mixed strategy Nash equilibrium is:*

- *a potential spy of characteristics (s, r) will spy with probability*

$$P^*(g|s, r) = t_r$$

- *the FBI will prosecute potential spies of characteristics (s, r) with probability*

$$\gamma^*(s, r) = \frac{v(s, r)}{v(s, r) + j(s, r)}.$$

Note that in Proposition 1, the federal prosecutors will prosecute suspects of characteristics (s, r) with higher probability if the benefit and cost ratio from spying $v(s, r)/j(s, r)$ is higher; this higher prosecution probability, however, results in a spying probability of this group being t_r, which does not depend on s and thus the same across all members of the same ethnicity r.

The first item in Proposition 1 suggests the following conviction (or dismissal) rate test for ethnic prejudice:

Proposition 2 *(Conviction Rate Test for Racial Prejudice, Knowles, Persico and Todd 2001). The average conviction rate conditional on being prosecuted for ethnicity-r suspects is given by*

$$S(r) = \int P^*(g|s, r) \frac{\gamma^*(s, r) f(s|r)}{\int \gamma^*(\tilde{s}, r) f(\tilde{s}|r) d\tilde{s}} ds = t_r.$$

Hence, the federal prosecutor is ethnically prejudiced against ethnicity-r suspects if $S(r) < S(r')$.

This simple "matching pennies"-like model shows that if the federal prosecutors are not ethnically prejudiced, all potential spies, if they are charged at all, must in equilibrium be convicted with equal probability regardless of their ethnicity and other characteristics. Thus there is no difference between the marginal and the average conviction rates. It is worthwhile to note that the model allows defendants of different ethnicities to have different distributions of characteristics, as long as those characteristics are observable to the federal prosecutors (though they may not be observable to the researcher). Potential spies with different characteristics may differ in their costs and benefits from spying, but these differences does not lead to different conviction rates between defendants with different ethnicities. Because the infra-marginality problem do not arise at all in the equilibrium of this simple model, it provide a theoretical basis for an empirical test based on the comparison of the average conviction rates, or equivalently, the average dismissal rate, of defendants of different ethnicities.

4 Empirical Results

4.1 Outcome Test

In this section, we implement the test implied by the model to determine whether there is evidence that ethnic prejudice plays any role in the DOJ's discretionary investigation and charging decisions. Note that to implement this test, we only require information on the ethnicities of the defendants, and whether they were convicted in the end. All of this data is readily available. Our test does not rely on knowing the information contained in s, which

is vital, since no data set contains the exhaustive list of information used by the prosecutors in their charging decisions. In this way, our simple model of federal prosecutors' behavior allows us to develop a simple outcome test that gets around the omitted variable problem. To implement the test, we first compare the *average* case outcomes between different ethnic groups. The null hypothesis is that case outcomes are independent from the defendants' ethnicities. which is the prediction of the model if the DOJ does not exhibit ethnic prejudice in its application of the EEA. For the defendant's ethnic group, we use four definitions of the categorical variable: 1) The most detailed category: Westerner, Chinese, other Asian, Middle eastern, Hispanic, and firms; 2) Chinese compared to all other individual defendants; 3) Chinese compared to westerners; and 4) Chinese, westerner, and all other individuals. For case outcomes, we first use the full sample, and then restrict our sample to the defendants whose cases were closed and then the defendants that were found guilty.

Table 10 reports the results from the χ^2-tests. Panel A uses the full sample and the outcome variable is defined with 8 values as detailed in Section 2: 1 = the defendant pleaded guilty to EEA related charges; 2 = the defendant pleaded guilty to non-EEA related charges only; 3 = the defendant was convicted on EEA related charges; 4 = the defendant was convicted on non-EEA related charges only; 5 = the case was dismissed; 6 = the defendant went fugitive; 7 = the case is still pending; 8 = the defendant died or committed suicide. The results strongly reject the null hypothesis that the average case outcomes are independent of the defendants' ethnicities. Panel B restricts to the sample with closed cases only. We first compare case outcomes as: pleaded guilty to EEA related charges vs. pleaded guilty to non-EEA charges only vs. convicted on EEA related charges vs. convicted on non-EEA charges only vs. dismissed. The null hypothesis is again rejected at 1% significance level. We then compare the case outcomes simply measured by the defendants being guilty vs. not guilty (i.e. dismissed or acquitted), we can also reject the null hypothesis at 5% significance level. Finally we define the case outcome as a dummy variable of guilty to EEA charges vs. not guilty of EEA charges, again we can reject the null hypothesis at 5% significance level. Lastly, we look at the guilty defendants only to examine the courts' punishment conditioning on the defendant being guilty. The defendants' disposition is defined as a dummy variable of probation vs. imprisonment. We can reject the null hypothesis of independence at 1% significance level.

[Table 10 about here]

The χ^2-tests almost always reject the null hypothesis no matter what definition we use to measure the case outcomes and defendants' ethnicities, however it only tests whether there is a relationship between the two, and does not tell us the direction or the size of the relationship when the null hypotheses is rejected. We further conduct a set of t-tests to test how the DOJ's indictment and case outcomes differ across different ethnic groups.

Table 11 report the results from the t-tests. Columns (1) and (2) report the results of comparing Chinese defendants and other defendants, and they show some statistically significant differences between the two groups. First, on the extensive margin, Chinese defendants were 13.2% *more* likely to be dismissed or acquitted compared to other defendants, and they were 13.5% *less* likely to be found guilty of EEA-related charges, both are statistically significant at 1% level. Second, while Chinese defendants were indicted of, on average, 2.6 *more* counts than other defendants as shown in Section 2, they were found guilty on similar, at least with no statistically significant difference, number of counts. As a result, Chinese defendants were found guilty on a smaller fraction of the counts being indicted on. Specifically, Chinese defendants were found guilty on 26.8% *fewer* counts and 24.1% *fewer* EEA-related counts compared to other defendants. All these differences are at 1% significance level. Panel B reports the results for the guilty defendants only and the results are very similar: Chinese defendants were found guilty on 25.9% *fewer* counts and 22.4% *fewer* EEA-related counts compared to other defendants, both are statistically significant at 1% significance level. Columns (3) and (4) restrict to individual defendants only and compare Chinese defendants to western defendants. The results are similar: at the extensive margin, Chinese defendants were 13.4% more likely to be dismissed or acquitted, and were 18.3% less likely to be found guilty on EEA related charges; at the intensive margin, Chinese defendants were found guilty on 29.1% fewer counts and on 27.7% fewer EEA-related counts compared to their westerner counterparts. All results remain statistically significant at 1% level.

President Barack Obama in 2013 pledged that the DOJ would do more to combat the threat of Chinese espionage, and thus one may expect that the DOJ may take a more aggressive step in its application of the EEA on Chinese suspects. Columns (5)-(8) in Table 11 report the results for the period before and after Obama's pledge separately to examine whether there is any difference in the level of the federal prosecutors' prejudice against Chinese defendants. It shows that before 2012, there was no statistically significant difference in the dismissal rate or the probability of being found guilty on EEA-related charges between Chinese defendants and other defendants; and after 2012, Chinese defendants were 16.5% more likely to be dismissed, and were 17.2% less likely to be found guilty on EEA-related charges, both are statistically significant at 10% significance level. On the other hand, before 2012 Chinese defendants were found guilty on 29.5% fewer counts and 25.1% fewer EEA-related counts; but the number becomes smaller after 2012: Chinese defendants were found guilty on 20% fewer counts and 20% fewer EEA-related counts.

[Table 11 about here]

4.2 Marginal Cases

As explained in Section 3.1, an outcome test comparing the average case outcomes and average sentencings across different ethnic groups may suffer from the infra-marginality problem when the underlying distribution of a suspect being guilty is different across groups. Our main results that test for ethnic prejudice are based on the simple model presented in Section 3.2, and as such, evidence for or against ethnic prejudice comparing the average conviction rate is only as credible as our proposed model. In Appendix B, we present a model in which we illustrate why an action-based test is not informative about the federal prosectors' prejudice, and more importantly, we show that the infra-marginality problem may reappear under more generalized setting.

In order to test the robustness of our results, we try to compare cases on the margin between different ethnic groups. In particular, we use three definitions of marginal case: (1) Cases with mixed defendant outcomes, i.e. the case has at least one defendant who has been dismissed and at least one defendant who was found guilty on EEA related counts or non-EEA related serious crimes; (2) Definition 1 plus the defendants who were only convicted on or pleaded guilty to false statement charges; (3) Definition 2 plus the defendants who were sentenced to probation only. These cases or defendants are arguably on the margin: the cases with mixed outcomes have insufficient evidence to convict all defendants in the case, and the defendants in definition 2 and 3 are either only guilty on minor counts or were sentenced to very light punishments.

Columns (9) and (10) in Table 11 report the results for the same set of t-tests as above for the marginal case sample. We report the results for Definition 3 which has the largest sample size and thus higher statistical power, and the results for the other two definitions are reported in SI Appendix Tables C5-C6. It shows that most of our previous evidences for ethnic prejudice hold for the marginal cases sample, and even to a larger extent for some outcome measures. We find that Chinese defendants were indicted on 5.3 *more* counts overall, and were indicted on 1.8 *more* EEA-related counts. On the other hand, Chinese defendants were found guilty on 0.5 *fewer* EEA-related counts, and as a result, Chinese defendants were found guilty on 39% *fewer* counts overall and 37% *fewer* EEA-related counts compared to other defendants. Accordingly, compared to other defendants, Chinese defendants were 12% *more* likely to be dismissed or acquitted, and were 25% *less* likely to be found guilty on EEA-related charges. All results discussed above are statistically significant, and most of them are robust to different definitions of marginal cases.

4.3 Does Citizenship Matter?

One may argue that the DOJ and the US Attorneys may rush to file charges against some foreign nationals based on less sufficient evidence considering the risk that continuing the investigation could allow the suspect to flee the country. By coding the nationality of each defendant, we are able to distinguish between Chinese Americans and Chinese citizens, and the former should have very low risk of fleeing the country. Chinese Americans, either born in the US or naturalized US citizens, have spent decades in the US and thus having much stronger ties to US than to China. Moreover, by choosing to become US citizens, they have demonstrated by their actions that they prefer what America has to offer more than other countries. Therefore, concerns that continuing an investigation without filing charges would allow a suspect to flee the country are moot in cases involving Chinese Americans compared to the ones involving non-citizens. As Congresswoman Grace Meng argues, "The pattern of targeting investigations of Chinese Americans on the basis of national origin fundamentally goes against the basic civil liberties owed to every American citizen" (Press Release (2015)).

In Table 12, we report the results for the same set of t-tests as in Table 11 for different pairs of groups. The first two columns restrict to the sample of US citizens and report the results comparing Chinese Americans to citizens with other ethnicities. It shows that most of our previous evidences for ethnic prejudice hold for the citizens sample. While Chinese American defendants were indicted on more counts as shown in Section 2, they were found guilty on 0.1 *fewer* EEA-related counts (though not statistically significant), and as a result, Chinese defendants were found guilty on 31.5% *fewer* counts overall and 28.2% *fewer* EEA-related counts compared to other US citizen defendants. Similarly, for the defendants who were found guilty, Chinese defendants were found guilty on 32.6% *fewer* counts overall and 27% *fewer* EEA-related counts compared to other US citizen defendants. Accordingly, compared to other citizen defendants, Chinese American defendants were 13% *more* likely to be dismissed or acquitted, and were 22.2% *less* likely to be found guilty on EEA-related charges.

As non-citizens account for 60% of the Chinese-named defendants, we are also interested in seeing whether these defendants were prosecuted under prejudice. To further examine the effect of citizenship on the DOJ's and the court's decisions, we compare citizens with non-citizens and Chinese Americans with Chinese nationals. The results are reported in Columns (3) and (4), and Columns (5) and (6) accordingly. Columns (3) and (4) suggest that citizens received some slightly more lenient treatment from the DOJ in its prosecutions. On average, they were found guilty on 13.2% *more* EEA counts. For the defendants who were found guilty, citizens were found guilty on 9.2% more counts and 14.9% more EEA related counts. However, this "citizen advantage" does not seem to apply to the Chinese-named defendants. There are no statistically significant differences between Chinese Americans and

Chinese nationals in their case outcomes.

Overall, Table 12 suggests that the defendant's citizenship may have played some role in the DOJ's prosecutorial decisions, but what really matters is the defendant's ethnicity, and this is especially true for the Chinese-named defendants.

[Table 12 about here]

4.4 Sentencing Outcomes

As discussed in Section 3.1, our outcome tests are based on the assumption that the court and the judges are unbiased against any ethnic group. In this section, we further examine the sentencing outcomes of the defendants who were found guilty.

Table 13 reports the results for different measures of sentencing outcomes for different samples of defendants. We restrict the sample to the defendants who were found guilty and examine the differences between the punishments imposed on Chinese defendants versus other defendants. The results show that Chinese defendants on average received harsher punishments compared to other defendants or compared to westerner-named defendants. Chinese defendants were 23.1% *less* likely to receive sentences of probation only compared to other defendants, and were 23.6% *less* likely compared to western-named defendants. Moreover, for the defendants who were sentenced to imprisonment, Chinese defendants on average received 12.5 months *longer* jail term. All results are significant at 5% level. For the defendants who were sentenced to probation, there is no statistically significant difference in the length of sentencing between Chinese defendants and others.

One may wonder if the differences in punishment can be due to that the court imposed more lenient punishments on the defendants who pleaded guilty and Chinese defendants had lower propensity to plea guilty compared to other defendants. Thus we further look at the defendants who have pleaded guilty and those who have not separately. The same patterns hold: For those who have pleaded guilty, Chinese defendants were 26.9% *less* likely to receive sentences of probation only compared to other defendants, and were 27.7% *less* likely compared to western-named defendants, both are significant at 1% level. For those who were convicted by trial, defendants with different ethnicities does not show statistically difference in the probability of being sentenced to probation only. However, Chinese defendants on average were sentenced to 45.1 months of *longer* jail time compared to other defendants, and to 44.9 months *longer* compared to western-named defendants.

Columns (9) and (10) report the results for the marginal case sample. They show that, compared to other defendants, Chinese-named defendants were 28.2% *less* likely to be sentenced to probation only, and were 31.6% *less* likely if they pleaded guilty rather than being convicted by trial. Moreover, we find that Chinese defendants were on average sentenced

to 31.3 months *longer* imprisonment time, and this effect mainly comes from the group of defendants who have not pleaded guilty.

[Table 13 about here]

As above, we further examine whether citizenship drives the differences between the sentencing outcomes of Chinese defendants and defendants in other ethnic groups, and the results are reported in Table 14. Columns (1) and (2) compare Chinese Americans and citizens with other ethnicities. We find that, compared to other defendants, Chinese American defendants were 16.6% *less* likely to be sentenced to probation only. Moreover, we find that Chinese defendants were on average sentenced to 15.2 months *longer* imprisonment time, and this effect mainly comes from the group of defendants who have not pleaded guilty. Columns (3) and (4) compare citizens and non-citizens. It shows that, while the probability of being found guilty has no statistically significant difference between citizens and non-citizens, conditional on being found guilty, citizens were 31.3% *more* likely to be sentenced to probation only. Conditional on the defendants pleaded guilty, citizens were 39.3% *more* likely to be sentenced to probation only, and they were sentenced to 4.5 months *shorter* imprisonment time on average (though statistically not significant). Columns (5) and (6) compare Chinese Americans and Chinese nationals. While there is no statistically significant difference between them overall, conditioning on the defendants pleaded guilty, Chinese Americans were 28.1% *more* likely to be sentenced to probation only, and they were sentenced to 9.8 months *shorter* imprisonment time but 7.3 months *longer* probation time. Overall, Table 14 suggests that both the defendants' ethnicities and citizenship help to explain the differences in sentencing outcomes between Chinese defendants and defendants of other ethnicities.

[Table 14 about here]

Remark 4 One may argue that harsher punishment on Chinese-named defendants may be explained by that Chinese defendants were more frequently indicted on 18 U.S. Code §1831, and penalties for theft of a trade secret not involving a foreign nation are less harsh than for a theft involving a foreign nation (Desmet (1999)).[13] We show in Appendix Table C2 that our results are robust to the exclusion of the 49 defendants who were indicted on at least one count of 18 U.S. Code §1831, and thus suggesting that the indicted code may not be the main reason explaining the differences in punishment between Chinese defendants and other defendants.

[13] 18 U.S. Code §1832 limits punishment of individuals to $500,000, 10 years imprisonment, or both, and of organizations to $5,000,000).

Remark 5 Our application of the outcome test is based on the assumption that the court is fair and unbiased. The empirical results, on the other hand, may suggest that Chinese defendants received harsher punishments than their westerner counterparts, which make our assumption invalid. However this result is actually biased in favor of our findings: even if the courts engage in ethnic prejudice, they are prejudiced against the Chinese defendants, and if they had not engaged in ethnic prejudice, we should expect the dismissal rate for the Chinese defendants to be even higher.

Remark 6 We should point out that our results in this section do not necessarily mean that judges are ethnically prejudiced against Chinese defendants. Due to data limitation, we are unable to control for other case characteristics in comparing the sentencing outcomes between defendants of different ethnic groups. As a result, the differences in the sentencing outcomes may well be due to the differences in case characteristics such as the content of the trade secrets being stolen, the monetary loss caused by the theft, etc.

4.5 Stock Market Reactions to Case Related News

In this section, we further examine the stock market reactions of the publicly listed victim firms. Filing of a criminal case under the EEA releases an important piece of information to the investors that there may have been severe trade secret leakage for the victim firm, which may lead to lower firm values in the future. We take advantage of the fact that stock market incorporates investors' expectations about the future development in the current pricing of a firm's equity; thus, to the extent that the market expects the loss of trade secret to lead to potential loss of firm value in the long run, the effect will be reflected in the changes in the stock market prices upon the filing of the case. Moreover, as the market expects the cases with Chinese defendants to be dismissed with higher probability, the change in the stock price of the victim firms in these cases upon case filing should be smaller.

Specifically, we employ a difference-in-difference approach by comparing victim firms with non-victim firms that are otherwise similar before and after the case filing date (or case closing date). Our analyses are conducted on the pooled sample of victim firms and firms matched by propensity scores. The sample of victim firms includes all publicly listed firms that are allegedly victims of trade secrets theft as stated in the court documents, as well as firms whose direct subsidiaries are victim firms. We match each victim firm in year t with a non-victim firm from the same year and 2-digit Standard Industrial Classification (SIC) industry code that has the closest propensity score, estimated using log firm size, market-to-book ratio, and return on assets (ROA) measured at year $t-1$. Data on stock price and other key variables are collected from Wharton Research Data Services (WRDS). In the end, we are able to identify 117 matched firm pairs, and we construct two panel datasets

of 150-days window around the case filing date and the case closing date. As the level of stock prices varies largely across different firms, to focus on the relative price change before and after the shock, we normalize all stock prices by the average price between 150 days to 50 days before the case filing date. Lastly, we further merge these datasets with case-level data from previous sections to control for case heterogeneities. To assess the difference in the effects of EEA-related cases on the victim firms' and non-victim firms' equity value, we run the following regression:

$$Price\_Index_{it} = \alpha + \beta_1 \cdot T_{it} + \beta_2 \cdot Victim\_Firm_i \cdot T_{it} + \gamma \cdot \mathbf{X}_c \cdot T_{it} + \theta_i + \upsilon_t + \epsilon_{it} \quad (1)$$

where t is the day in the event window; $Price\_Index_{it}$ is the dependent variable that is the firm i's normalized price index at day t; T_{it} is the treatment dummy that equals 1 after the case filing date or case closing date depending on the treatment we are interested in; θ_i is the firm fixed effect; and the control variables $\mathbf{X}_c$ are case characteristics. Our coefficient of interest is β_2, which captures the difference in the stock market reactions between victim firms and non-victim firms.

The results are presented in Tables 15-16. In Table 15 we report the regression results using case filing date as the treatment date. Columns (1)-(3) report results for the 20-days window around the case filing date, for the full sample, cases with Chinese defendants and cases without Chinese defendants separately. In all regressions, we control for day fixed effects and firm fixed effects. Column (1) shows that the stock prices of the victim firms drop more by 3% on average compared to the non-victim firms that are otherwise similar. Columns (2) and (3) show that the effect is smaller for the victim firms involved in the cases with Chinese defendants: their stock prices only drop by 2% compared to the 4% for the firms in cases without Chinese defendants. All results are significant at 1% level. Columns (4)-(6) report results for the 40-days window and Columns (7)-(9) report results for the 60-days window. The results are quantitatively similar: the negative effect on stock prices of victim firms in cases without Chinese defendants is more than twice as large as that of firms with Chinese defendants. These results are consistent with our expectation that the announcement of the EEA cases reveals information about the lost of trade secret for the victim firms and thus leading to lower firm value, which are reflected in the stock prices upon the announcement of the cases. As the cases with Chinese defendants are dismissed with higher probability, the market takes into account that information and thus reacting less to the cases.[14]

[Table 15 about here]

[14]We also conducted the same analysis separately for the period before and after 2013, but the results do not show any significant differences between the two periods. The results are available upon request.

In Table 16 we report the regression results using case closing date as the treatment date. Column (1)-(3) report results for the full sample, for all cases, dismissed cases and cases found guilty separately. We report the results for the 20-days event window.[15] Column (1) shows that closing the case do not have a significant effect on stock price for the full sample, probably because that the market has already anticipated the result and most of the effects are already reflected in the stock market reactions at the case filing date. Column (2) shows that the victim firms' stock price increase by 18.8% if the case was dismissed. The dismissal of the case suggests that there was no loss of trade secret and thus the market respond by correcting for previous misperception. Column (3) shows that there is no significant effect on stock price if the case was found guilty. Columns (4)-(6) report results for cases with Chinese defendants only, and Columns (7)-(9) report results for cases without Chinese defendants only. Similar to what we find for the case filing date, closing the case mainly affects the victim firms in the cases without Chinese defendants, and does not have any significant effect on the firms in the cases with Chinese defendants.

[Table 16 about here]

Overall, the results on stock market reactions to the filing and closing of the EEA cases suggest that the market perceives the DOJ's public disclosure of an alleged trade secret theft of the victim firm to be much less consequential if the defendants are Chinese.

5 Conclusion

Since the Obama administration, there has been a surge in the number of cases by the DOJ that applied the EEA related charges against Chinese suspects; this trend further accelerated in the Trump administration with the initiation of "China Initiative." This raises serious concerns of potential ethnic profiling as pointed out by Rep. Judy Chu of California and Rep. Jamie Raskin of Maryland. In this paper we empirically test for the presence of ethnic prejudice in the DOJ's application of the EEA based on the dismissal rate of the defendants who were indicted on EEA related charges since 1996. Our results show that Chinese defendants on average received more counts of indictments, but were found guilty on fewer counts, and they were more likely to be dismissed by trial or acquitted by jury, which suggests that the DOJ tends to charge Chinese defendants with less sufficient evidence. Moreover, for the ones who were found guilty, Chinese defendants were likely to receive harsher punishments than their westerner counterparts. In awareness of the infra-marginality problem, we further perform the tests on the marginal defendants whose cases have mixed outcome or

[15]The results are also quantitatively and quanlitatively robust to using 40-days and 60-days window. Results are available from the authors upon requeset.

who were sentenced to very light punishment. Our results remain qualitatively robust and statistically significant. We also find that, for those publicly listed victim firms whose trade secrets were allegedly stolen by the charged defendants, the stock market reaction was much more muted to the news (either the case filing date or the case closing date) if the charged defendants are of Chinese. This suggests that the market perceives the DOJ's public disclosure of an alleged trade secret theft of the victim firm to be much less consequential if the defendants are Chinese. Summarizing the plethora of evidence, our study provides strong evidence suggesting that the DOJ's prosecutorial decisions in the application of the EEA may have been tainted by ethnic prejudice against Chinese, including American citizens of Chinese descent. Ethnic prejudice the application of the EEA not only is antithetical to American values, but also diminishes the effectiveness in protecting American trade secrets and innovations.

There are two caveats to our conclusion. First, DOJ may be more zealously pursuing cases against Chinese-named defendants to deter against future thefts of trade secrets by Chinese. Whether this is the case, and whether a deterrence strategy is optimal, deserve further investigations (see Persico (2002) for a discussion of the optimal deterrence). Second, as the application of EEA code has experienced a surge in recent years, especially after the DOJ's 2018 "China Initiative" and the case usually takes a long time to close, there are still about a quarter of the cases in our data set with a pending outcome, and Chinese defendants account for a big proportion in these cases. Our findings need to be reassessed as more of these pending cases are resolved.

References

Alesina, A. and E. L. Ferrara (2014). A Test for Racial Bias in Capital Punishment. *American Economic Review 104*, 3397–3433.

Anwar, S., P. Bayer, and R. Hjalmarsson (2012). The impact of jury race in criminal trials. *The Quarterly Journal of Economics 127*, 1017–1055.

Anwar, S. and H. Fang (2006). An Alternative Test of Racial Prejudice in Motor Vehicle Searches: Theory and Evidence. *American Economic Review 96*(1), 127–151.

Anwar, S. and H. Fang (2015). Testing for Racial Prejudice in the Parole Board Release Process: Theory and Evidence. *The Journal of Legal Studies 44*(1), 1–37.

Arnold, D., W. Dobbie, and C. S. Yang (2018). Racial Profiling, Fairness, and Effectiveness of Policing. *Quarterly Journal of Economics 133(4)*, 1885–1932.

Ayres, I. (2001). *Pervasive Prejudice? Unconventional Evidence of Race and Gender Discrimination*. Chicago: University of Chicago Press.

Becker, G. S. (1957). *The Economics of Discrimination*. Chicago: University of Chicago Press.

Becker, G. S. (1993a). Nobel Lecture: The Economic Way of Looking at Behavior. *Journal of Political Economy 101(3)*, 385–409.

Becker, G. S. (1993b). The Evidence against Blacks Doesn't Prove Bias. *Business Week, April 19 1*, 1.

Berdejó, C. (2018). Criminalizing Race: Racial Disparities in Plea-bargaining. *BCL Rev. 59*, 1187.

Desmet, T. O. (1999). The Economic Espionage Act of 1996: Are We Finally Taking Corporate Spies Seriously. *Hous. J. Int'l L. 22*, 93.

Edelman, W. J. (2010). The Benefit of Spying: Defining the Boundaries of Economic Espionage under the Economic Espionage Act of 1996. *Stan. L. Rev. 63*, 447.

Fischman, J. B. and M. M. Schanzenbach (2012). Racial Disparities under the Federal Sentencing Guidelines: The Role of Judicial Discretion and Mandatory Minimums. *Journal of Empirical Legal Studies 9*(4), 729–764.

Hvistendahl, M. (2020). *The Scientist and the Spy: A True Story of China, the FBI, and Industrial Espionage*. Penguin.

Kim, A. C. (2018). Prosecuting Chinese Spies: an Empirical Analysis of the Economic Espionage Act. *Cardozo L. Rev. 40*, 749.

Kim, B., X. Wang, and H. Cheon (2019). Examining the Impact of Ecological Contexts on Gender Disparity in Federal Sentencing. *Justice Quarterly 36*(3), 466–502.

Knowles, J., N. Persico, and P. Todd (2001). Racial Bias in Motor Vehicle Searches: Theory and Evidence. *Journal of Political Economy 109*(1), 203–229.

Lewis, M. K. (2020). Criminalizing China. *Journal of Criminal Law and Criminology 111*(1).

Mayson, S. G. (2018). Bias in, Bias out. *Yale Law Journal 128*, 2218.

Mustard, D. B. (2001). Racial, Ethnic, and Gender Disparities in Sentencing: Evidence from the US Federal Courts. *The Journal of Law and Economics 44*(1), 285–314.

Orozco, D. (2012). Amending the Economic Espionage Act to Require the Disclosure of National Security-related Technology Thefts. *Cath. UL Rev. 62*, 877.

Persico, N. (2002). Racial Profiling, Fairness, and Effectiveness of Policing. *American Economic Review 92 (5)*, 1472–97.

Rehavi, M. M. and S. B. Starr (2014). Racial Disparity in Federal Criminal Sentences. *Journal of Political Economy 122*(6), 1320–1354.

Ross, S. and J. Yinger (2002). *The Color of Credit*. Cambridge, MA: MIT Press.

Sanger, D. E. (2013). In Cyberspace, New Cold War. *The New York Times 1*(Feb 24).

Shermer, L. O. and B. D. Johnson (2010). Criminal Prosecutions: Examining Prosecutorial Discretion and Charge Reductions in US Federal District Courts. *Justice Quarterly 27*(3), 394–430.

Starr, S. B. (2015). Estimating Gender Disparities in Federal Criminal Cases. *American Law and Economics Review 17*(1), 127–159.

Press Release (2015). Rep. Chu Joins Wrongly Accused Asian American Scientists to Call for Accountability from DOJ and an End to Profiling. https://chu.house.gov/press-release/rep-chu-joins-wrongly-accused-asia-american-scientists-call-accountability-doj-and.

Ulmer, J. T., M. T. Light, and J. H. Kramer (2011). Racial Disparity in the Wake of the Booker/Fanfan Decision: An Alternative Analysis to the USSC's 2010 Report. *Criminology & Pub. Pol'y 10*, 1077.

Yang, C. S. (2015). Free at Last? Judicial Discretion and Racial Disparities in Federal Sentencing. *The Journal of Legal Studies 44*(1), 75–111.

Table 1: Benefiting Counties: Case Level

	All		PACER		Press Release	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
China	92	36.36	71	33.81	21	46.34
India	4	1.58	4	1.90	0	0
Japan	2	0.79	1	0.48	1	2.44
Other	16	6.32	13	6.19	3	7.32
Russia	4	1.58	1	0.48	3	7.32
South Korea	6	2.37	5	2.38	1	2.44
US	129	50.99	115	54.76	14	34.15
Total	253	100	210	100	43	100

Note: This table presents the descriptive statistics of the distribution of the cases' benefiting country at case level, for the full sample, and for the PACER sample and press release sample separately.

Table 2: Ethnicity of Defendants

	All		PACER		Press Release	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Westerner	170	40.57	150	43.86	20	25.97
Chinese	159	37.95	111	32.46	46	59.74
Other Asian	38	9.07	29	8.48	9	11.69
Hispanic	10	2.39	10	2.92	0	0.00
Middle Estern	6	1.43	6	1.75	0	0.00
Unknown	1	0.24	1	0.29	0	0.00
Firm	35	8.35	33	9.65	2	2.60
Total	419	100	342	100	77	100

Note: This table presents the descriptive statistics of the distribution of the defendants' ethnicities, for the full sample (All), and for the PACER sample and press release sample separately.

Table 3: Ethnicity of Defendants by Benefiting Country

		Benefiting Country			
		China	US	Other	Total
Ethnicity	Westerner	17	132	21	170
	Chinese	137	19	3	159
	Other	29	35	26	90
	Total	183	186	50	419

Note: This table presents the descriptive statistics of the distribution of the defendants' ethnicity by the cases' benefiting country. The data sample includes all defendants.

Table 4: Citizenship of Defendants by Ethnicity

	Westerner	Chinese	Other Asian	Hispanic	Middle Estern	Unknown	Total
Citizen	159	57	13	9	5	1	244
Non-citizen	11	102	25	1	1	0	140
Total	180	159	38	10	6	1	384

Note: This table presents the descriptive statistics of the defendants' citizenship by ethnicity group. The data sample includes all defendants.

Table 5: Defendants by Ethnicity

	1996-2008		2009-2015		2016-2020	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Westerner	97	59.51	41	29.29	32	27.59
Chinese	30	18.4	70	50	59	50.86
Other Asian	16	9.82	14	10	8	6.90
Hispanic	6	3.68	2	1.43	2	1.72
Middle Estern	4	2.45	1	0.71	1	0.86
Unknown	1	0.61	0	0	0	0.00
Firm	9	5.52	12	8.57	14	12.07
Total	163	100	140	100	116	100

Note: This table presents the descriptive statistics of the distribution of the defendants' ethnicities in three time periods: 1996-2008, 2008-2015 (Obama Administration), and 2016-Present (Trump Administration). The data sample includes all defendants.

Table 6: Summary Statistics: Case Outcomes- Defendant Level

	All		Chinese		Other	
	Freq.	%	Freq.	%	Freq.	%
Guilty of EEA charges	190	45.35	55	34.38	135	52.12
Plead guilty to EEA charges	165	39.38	47	29.38	118	45.56
Convicted by EEA charges	32	7.64	8	5.00	24	9.27
Guilty of non-EEA charges	55	13.13	14	8.75	41	15.83
Plead guilty to non-EEA charges	42	10.02	9	5.63	33	12.74
Convicted by non-EEA charges	6	1.43	5	3.13	1	0.39
Dismissed	69	16.47	30	18.75	39	15.06
Total terminated	314	74.94	99	61.88	215	83.01
Dismiss rate	21.97%		30.30%		18.14%	
Fugitive	33	7.88	24	15.00	9	3.47
Pending	68	16.23	36	22.50	32	12.36
Other	4	0.95	1	0.63	3	1.16
Total	419		160		259	

Note: This table presents the descriptive statistics of case outcomes at defendant level, for the full sample, and for Chinese defendants and other defendants separately. The data sample includes all defendants.

Table 7: Summary Statistics: Punishment of Guilty Defendants by Ethinicity

	All		Chinese		Other	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Fraction probation	38.37%		21.74%		45.89%	
Length of probation (months)	35.44	17.06	34.8	18.17	35.56	16.96
Fraction imprisonment	61.63%		78.26%		54.11%	
Length of imprisonment (months)	28.92	30.04	37.13	40.67	24.68	21.78
Restitution ($)	1,682,153	17,948,560	222,931.20	844,387.60	2,254,234	21,159,502
Fine ($)	809,306.5	6,954,695	420,793.50	3,344,893	961,621.30	7,937,770
Observation	245		69		176	

Note: This table presents the descriptive statistics of the punishment of guilty defendants, for the full sample, and for Chinese defendants and other defendants separately. The data sample includes defendants who are found guilty.

Table 8: Summary Statistics: Number of Counts Indicted and Guilty

	All			Chinese		Others		Diff. (Chinese - Others)	
	Obs.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Value	t-value
Panel A: Full Sample									
# of counts indicted 1831	49	3.24	5.00	3.78	6.11	2.24	1.09	1.55	1.39
# of counts indicted 1832	393	3.23	4.90	3.75	4.25	2.90	5.23	0.85	1.76
# of counts indicted other	204	7.25	11.30	7.19	8.00	7.29	13.38	-0.10	-0.07
# of counts indicted FS	18	1.89	1.53	2.18	1.83	1.43	0.79	0.75	1.20
Panel B: Defendants in Terminated Cases									
# of counts indicted 1831	17	3.41	6.63	4.17	7.86	1.60	0.55	2.57	1.12
# of counts guilty 1831	16	1.81	3.12	2.27	3.69	0.80	0.84	1.47	1.25
# of counts indicted 1832	294	3.14	4.69	4.43	4.71	2.56	4.56	1.87	3.17
# of counts guilty 1832	291	0.94	1.38	0.98	1.78	0.95	1.20	0.03	0.12
# of counts indicted other	147	6.26	8.03	6.42	6.71	6.16	8.79	0.27	0.21
# of counts guilty other	146	1.12	2.30	0.72	1.47	1.37	2.68	-0.65	-1.89
# of counts indicted FS	17	1.94	1.56	2.30	1.89	1.43	0.79	0.87	1.31
# of counts guilty FS	17	1.06	0.97	1.00	0.94	1.14	1.07	-0.14	-0.28

Note: This table presents the descriptive statistics of the number of counts indicted and found guilty at defendant level. The data sample for Panel A includes all 409 defendants. The data sample for Panel B includes defendants defendants in terminated cases only.

Table 9: Summary Statistics: Number of Counts Indicted and Guilty (By Citizenship)

	Chinese American (1)		Other Citizens (2)		Chinese Nationals (3)		Difference 1 (1)-(2)		Difference 2 (1)-(3)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Value	t-value	Value	t-value
# of counts indicted 1831	1.67	0.82	1.00	0.00	6.67	10.97	0.67	2.00	-5.00	-1.11
# of counts guilty 1831	0.60	0.89	1.00	0.00	3.67	4.63	-0.40	-1.00	-3.07	-1.59
# of counts indicted 1832	5.19	5.48	2.75	4.97	3.83	3.88	2.44	2.63	1.36	1.34
# of counts guilty 1832	0.95	1.38	0.97	1.22	1.02	2.09	-0.02	-0.09	-0.07	-0.19
# of counts indicted other	6.00	7.38	6.09	9.36	6.77	6.20	-0.09	-0.05	-0.77	-0.42
# of counts guilty other	0.62	1.10	1.14	2.10	0.81	1.74	-0.53	-1.60	-0.19	-0.50
# of counts indicted FS	1.43	0.79	1.50	0.84	4.33	2.31	-0.07	-0.16	-2.90	-2.13
# of counts guilty FS	0.86	0.69	1.17	1.17	1.33	1.53	-0.31	-0.57	-0.48	-0.52

Note: This table presents the descriptive statistics of the number of counts indicted and found guilty at defendant level. The data sample includes defendants in terminated cases only.

Table 10: χ^2-Test: Case Outcome and Defendant Ethnicity

Outcome	Ethnicity	χ^2 Stat.	p-value
	Panel A: Full Sample		
All outcomes	All ethnicities	139.56	0.00
	Chinese vs. Others	43.18	0.00
	Chinese vs. Westerners	64.72	0.00
	Chinese vs. Westerners vs. Others	81.73	0.00
	Panel B: Terminated cases only		
Pleaded to EEA	All ethnicities	46.17	0.00
vs. Pleaded to non-EEA	Chinese vs. Others	15.35	0.00
vs. Convicted by EEA	Chinese vs. Westerners	14.72	0.01
vs. Convicted by non-EEA	Chinese vs. Westerners vs. Others	24.80	0.00
vs. Dismissed			
Guilty vs. Not Guilty	All ethnicities	14.45	0.03
	Chinese vs. Others	9.65	0.00
	Chinese vs. Westerners	9.41	0.00
	Chinese vs. Westerners vs. Others	9.40	0.01
Guilty to EEA vs. Not guilty to EEA	All ethnicities	15.50	0.02
	Chinese vs. Others	5.25	0.02
	Chinese vs. Westerners	8.78	0.00
	Chinese vs. Westerners vs. Others	12.22	0.00
	Panel C: Guilty defendants only		
Probation vs. Imprisonment	All ethnicities	20.26	0.00
	Chinese vs. Others	11.23	0.00
	Chinese vs. Westerners	10.79	0.00
	Chinese vs. Westerners vs. Others	11.28	0.00

Note: This table reports the results of the χ^2-tests at the defendant level. The null hypothesis is that the outcome variable and the ethnicity variable are independent. We use different definitions of case outcome and defendant's ethnicity. "All outcomes" represents "pleaded guilty to EEA charges vs. pleaded guilty to non-EEA charges vs. convicted by EEA charges vs. convicted by non-EEA charges vs. dismissed vs. pending vs. fugitive vs. suicide. "All ethnicities" represents "Westerner vs. Chinese vs. other Asian vs. Middle eastern vs. Hispanic vs. and firms. Panel A reports results for the full sample. Panel B reports results for the closed cases only. Panel C reports results for guilty defendants.

Table 11: Outcome Test: Case Outcomes and Defendant Ethnicity

	Full Sample Chinese vs. Others		Individuals only Chinese vs. Westerners		By Time Periods 1996-2012		By Time Periods 2013-Present		Marginal Case	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Diff.	t-value	Diff.	t-value	Diff.	t-value	Diff.	t-value	Diff.	t-value
Panel A: Defendants in Terminated Cases										
Case dismissed	0.132***	2.626	0.134**	2.522	0.0866	1.401	0.165*	1.747	0.116*	1.709
Guilty of EEA charges	-0.135**	-2.303	-0.183***	-3.004	-0.0926	-1.235	-0.172*	-1.663	-0.350***	-3.734
Total # of counts guilty	0.101	0.324	0.216	0.676	0.223	0.612	-0.0643	-0.1	-0.553	-1.23
# of EEA counts guilty	0.19	0.827	0.142	0.548	0.18	0.974	0.0511	0.0818	-0.596**	-2.541
% of counts guilty	-0.268***	-5.292	-0.291***	-5.494	-0.295***	-4.583	-0.200**	-2.201	-0.457***	-5.792
% EEA counts guilty	-0.241***	-4.297	-0.277***	-4.785	-0.251***	-3.488	-0.199**	-2.025	-0.436***	-4.738
Observations	314		255		222		92		113	
Panel B: Guilty defendants										
Total # of counts guilty	0.441	1.131	0.581	1.47	0.458	1.057	0.348	0.399	-0.616	-1.24
# of EEA counts guilty	0.469	1.609	0.41	1.261	0.33	1.529	0.469	0.542	-0.546*	-1.966
% of counts guilty	-0.259***	-4.955	-0.286***	-5.32	-0.315***	-4.997	-0.155	-1.533	-0.471***	-6.054
% EEA counts guilty	-0.224***	-3.795	-0.269***	-4.554	-0.261***	-3.572	-0.16	-1.462	-0.454***	-4.98
Observations	245		199		180		65		121	

Note: This table reports the results of the outcome test comparing Chinese defendants and defendants with other ethnicities. The data sample for Panel A includes all defendants defendants in terminated cases. The data sample for Panel B includes defendants that are found guilty only. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 12: Outcome Test: Case Outcomes and Defendant Citizenship

	Chinese American vs. Other citizens		Citizens vs. Non-citizens		Chinese American vs. Chinese nationals	
	(1)	(2)	(3)	(4)	(5)	(6)
	Diff.	t-value	Diff.	t-value	Diff.	t-value
Panel A: Defendants in Terminated Cases						
Total # of counts guilty	-0.122	-0.385	-0.647*	-1.862	-0.685	-1.13
# of EEA counts guilty	-0.0887	-0.435	-0.227	-0.886	-0.544	-0.989
% of counts guilty	-0.315***	-4.615	0.0894	1.541	-0.102	-1.349
% EEA counts guilty	-0.282***	-3.664	0.132**	2.093	-0.0792	-0.947
Case dismissed	0.130*	1.959	-0.0358	-0.64	0.0502	0.555
Guilty of EEA charges	-0.222***	-2.86	0.0569	0.867	-0.159	-1.657
Observations	223		296		99.00	
Panel B: Guilty Defendants						
Total # of counts guilty	0.0932	0.238	-0.906**	-2.146	-0.874	-1.022
# of EEA counts guilty	0.0886	0.352	-0.33	-1.04	-0.674	-0.846
% of counts guilty	-0.326***	-4.641	0.0919	1.571	-0.118	-1.253
% EEA counts guilty	-0.270***	-3.336	0.149**	2.294	-0.0619	-0.598
Observations	176		232		69.00	

Note: This table reports the results of the outcome test comparing defendants with different nationalities. The data sample for Panel A includes all defendants defendants in terminated cases. The data sample for Panel B includes defendants that are found guilty only. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 13: Sentencing Outcomes and Defendant Ethnicity

	Full Sample Chinese vs. Others		Individuals only Chinese vs. Westerners		By Time Periods 1996-2012		By Time Periods 2013-Present		Marginal Case	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Diff.	t-value	Diff.	t-value	Diff.	t-value	Diff.	t-value	Diff.	t-value
Panel A: Guilty Defendants										
Probation	-0.231***	-3.417	-0.236***	-3.361	-0.260***	-2.997	-0.0647	-0.62	-0.282***	-2.957
# of months imprisonment	12.46**	2.295	12.36**	2.059	17.12**	2.332	5.591	0.776	31.31*	1.903
# of months probation	-0.757	-0.157	0.698	0.142	-1.957	-0.349	5.111	0.434	2.151	0.42
Observations	245		199		180		65		121	
Panel B: Defendants Pleaded Guilty										
Probation	-0.269***	-3.588	-0.277***	-3.562	-0.296***	-2.926	-0.0815	-0.722	-0.316***	-3.074
# of months imprisonment	4.59	1.203	4.472	1.08	7.759	1.533	-2.228	-0.361	-1.654	-0.176
# of months probation	2.637	0.492	3.536	0.64	2.771	0.416	8.75	0.768	6.907	1.201
Observations	207		168		150		57		107	
Panel C: Guilty Defendants Convicted by Trial										
Probation	-0.00923	-0.0618	0.00855	0.0543	-0.0278	-0.163	-0.143	-0.354	-0.0667	-0.231
# of months imprisonment	45.09**	2.406	44.92**	2.142	32.16	1.386	103.2***	8.234	132.5**	5.684
# of months probation	-20	-1.852	-12	-1.195	-16.8	-1.548	-	-	-20	-1.852
Observations	38		31		26		8		14	

Note: This table reports the results of the outcome test comparing the sentencing outcomes of Chinese defendants and defendants with other ethnicities. The data sample for Panel A includes all defendants in terminated cases. The data sample for Panel B includes defendants that are found guilty only. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 14: Sentencing Outcomes and Defendant Citizenship

	Chinese American vs. Other citizens		Citizens vs. Non-citizens		Chinese American vs. Chinese nationals	
	(1)	(2)	(3)	(4)	(5)	(6)
	Diff.	t-value	Diff.	t-value	Diff.	*t*-value
Panel A: Guilty Defendants						
Probation	-0.166*	-1.732	0.313***	4.393	0.164	1.66
# of months imprisonment	15.20*	1.977	-4.584	-0.799	4.26	0.346
# of months probation	3.63	0.64	0.87	0.133	5.4	0.528
Observations	176		232		69	
Panel B: Defendants Pleaded Guilty						
Probation	-0.141	-1.265	0.393***	5.22	0.281**	2.65
# of months imprisonment	-2.037	-0.385	-4.716	-1.228	-9.769	-1.378
# of months probation	6.556	1.096	-0.00278	-0.00036	7.333	0.566
Observations	146		196		56	
Panel C: Guilty Defendants Convicted by Trial						
Probation	-0.0794	-0.519	-0.167	-0.927	-0.389	-1.562
# of months imprisonment	44.29*	2.072	-36.83	-1.38	-20.21	-0.348
# of months probation	-24	-1.549	1.2	0.0963	-18	-1.732
Observations	30		36		13	

Note: This table reports the results of the outcome test comparing the sentencing outcomes of defendants with different nationalities. The data sample for Panel A includes all defendants in terminated cases. The data sample for Panel B includes defendants that are found guilty only. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 15: Stock Market Response of Victim Firms - Case Filing Date

	+/- 10 days			+/- 20 days			+/- 30 days		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All	Chinese	No Chinese	All	Chinese	No Chinese	All	Chinese	No Chinese
File	0.0325***	0.0323**	0.0362*	0.0156	0.0209	0.0148	0.0154	0.0200	0.0158
	(0.0116)	(0.0131)	(0.0198)	(0.0118)	(0.0132)	(0.0203)	(0.0122)	(0.0138)	(0.0209)
Victim firm * File	-0.0305***	-0.0220***	-0.0400***	-0.0302***	-0.0168***	-0.0451***	-0.0300***	-0.0160***	-0.0457***
	(0.0047)	(0.0053)	(0.0081)	(0.0036)	(0.0040)	(0.0061)	(0.0031)	(0.0035)	(0.0053)
Counts * T	-0.0002	-6.07e-05	-0.0014	2.17e-05	2.25e-05	-0.0015*	0.0004*	0.0005**	-0.0015**
	(0.0004)	(0.0004)	(0.0011)	(0.0003)	(0.0003)	(0.0008)	(0.0002)	(0.0002)	(0.0007)
Constant	1.010***	1.014***	1.005***	1.027***	1.028***	1.025***	1.021***	1.026***	1.016***
	(0.0077)	(0.0087)	(0.0134)	(0.0081)	(0.0090)	(0.0140)	(0.0085)	(0.0095)	(0.0146)
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,597	2,978	2,619	10,934	5,818	5,116	16,265	8,653	7,612
R-squared	0.667	0.692	0.652	0.635	0.668	0.615	0.599	0.636	0.575

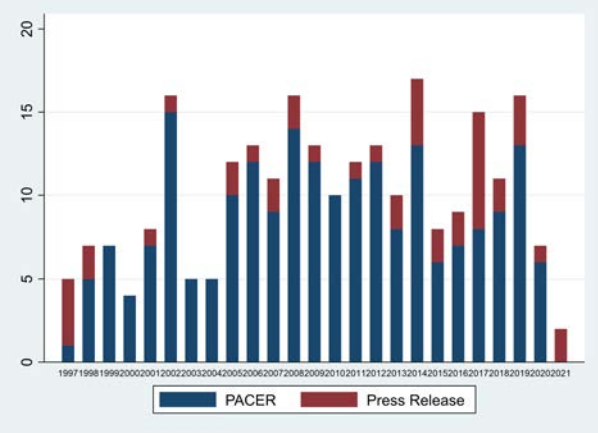
Note: This table reports the results of estimating Equation 1 using case filing date as the treatment date. Event day fixed effects and firm fixed effects are included in all columns. Robust standard errors are reported in the parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 16: Stock Market Response of Victim Firms - Case Closing Date

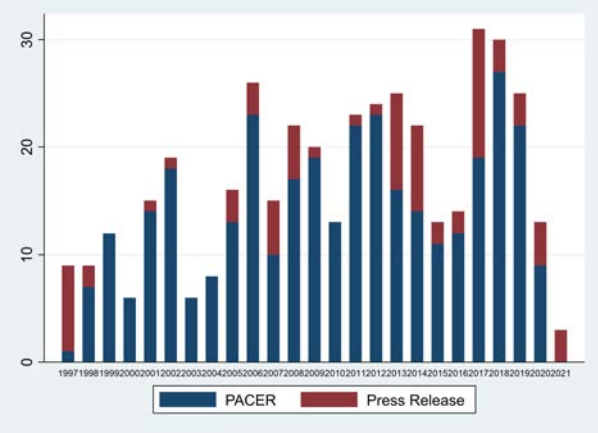
	All			Chinese Defendant			No Chinese Defendant		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All	Dismissed	Guilty	All	Dismissed	Guilty	All	Dismissed	Guilty
Close	-0.00976	-0.0356	-0.00625	0.0210	0.0535	0.0205	-0.0570	-0.122***	-0.0484
	(0.0352)	(0.0544)	(0.0384)	(0.0428)	(0.106)	(0.0455)	(0.0601)	(0.0392)	(0.0681)
Victim firm * Close	0.0354	0.188***	0.0209	-0.0246	0.160	-0.0362	0.124*	0.236***	0.109
	(0.0408)	(0.0651)	(0.0444)	(0.0500)	(0.132)	(0.0529)	(0.0690)	(0.0458)	(0.0780)
Constant	1.367***	1.647***	1.340***	1.545***	3.061***	1.436***	1.101***	0.470***	1.187***
	(0.0205)	(0.0337)	(0.0222)	(0.0252)	(0.0730)	(0.0265)	(0.0346)	(0.0221)	(0.0393)
Day FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,679	148	1,531	1,006	67	939	673	81	592
R-squared	0.828	0.972	0.807	0.862	0.904	0.845	0.742	0.905	0.728

Note: This table reports the results of estimating Equation 1 using case closing date as the treatment date. Event day fixed effects and firm fixed effects are included in all columns. Robust standard errors are reported in the parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Figure 1: Evolution of EEA Cases and Defendants over Time



(a) Number of Cases



(b) Number of Defendants

Notes: This figure plots the number of cases (Panel (a)) and the number of defendants (Panel (b)) charged under EEA U.S.C /S 1831 and/or /S 1832 over the period of 1996-2020. The blue bar represents number of cases and defendants in the PACER sample, and the red bar represents number of cases and defendants in the press release sample.

Appendix A: EEA Law Codes

18 U.S. Code §1831. Economic espionage

(a) In General.-

Whoever, intending or knowing that the offense will benefit any foreign government, foreign instrumentality, or foreign agent, knowingly -

(1) steals, or without authorization appropriates, takes, carries away, or conceals, or by fraud, artifice, or deception obtains a trade secret;

(2) without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys a trade secret;

(3) receives, buys, or possesses a trade secret, knowing the same to have been stolen or appropriated, obtained, or converted without authorization;

(4) attempts to commit any offense described in any of paragraphs (1) through (3); or

(5) conspires with one or more other persons to commit any offense described in any of paragraphs (1) through (3), and one or more of such persons do any act to effect the object of the conspiracy,shall, except as provided in subsection (b), be fined not more than $5,000,000 or imprisoned not more than 15 years, or both.

(b) Organizations.-

Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of $10,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided.

18 U.S. Code §1832. Theft of trade secrets

(a) Whoever, with intent to convert a trade secret, that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit of anyone other than the owner thereof, and intending or knowing that the offense will, injure any owner of that trade secret, knowingly-

(1) steals, or without authorization appropriates, takes, carries away, or conceals, or by fraud, artifice, or deception obtains such information;

(2) without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information;

(3) receives, buys, or possesses such information, knowing the same to have been stolen or appropriated, obtained, or converted without authorization;

(4) attempts to commit any offense described in paragraphs (1) through (3); or

(5) conspires with one or more other persons to commit any offense described in paragraphs (1) through (3), and one or more of such persons do any act to effect the object of the conspiracy, shall, except as provided in subsection (b), be fined under this title or imprisoned not more than 10 years, or both.

(b) Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of $5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided.

Appendix B: A Model with Inframarginality Problem

We now present a simple model of FBI agent's behavior that illustrates the inframarginality problem in the outcome test. Consider a representative FBI agent, facing a large pool of potential suspects of economic spies. Let $r \in \{C, W\}$ denote the race (or ethnicity) of the potential suspects, where C stands for Chinese, and W for whites (or non-Chinese).[16] Suppose that among the pool of potential suspects of race $r \in \{C, W\}$, a fraction $\pi^r \in (0, 1)$ of them is *truly* guilty of economic espionage.[17] The true value of π^r is difficult to know, and we allow the FBI agent to potentially have an unfounded belief regarding the fraction of the guilty among race-r suspects. We denote $\tilde{\pi}^r$ to be the FBI agent's belief regarding the fraction of the guilty among race-r suspects.

When the FBI agent investigates a potential suspect, he/she obtains via various channels many useful information that may be indicative of the true guilt of the suspect. Such information may include, for example, the gender, the age, the occupation, the employment and travel history, contact list, conversations, emails, etc. that the FBI is likely to obtain under search and wiretapping warrants. Note that while the FBI agent in charge of the investigation observes all the relevant information in his decision regarding whether to bring an EEA-related charge, a researcher will typically have access to only a small subset of the information unless a charge is actually filed. As is standard in this literature, we assume, however, that the FBI agent will use a *single-dimensional index* $\theta \in [0, 1]$ to summarize how all of the information he possesses about the suspect, which indicates about the likelihood that the suspect may be guilty of economic espionage.[18] We assume that, if a suspect of race $r \in \{C, W\}$ is actually guilty, then the index θ is randomly drawn from a continuous probability density distribution $f_g^r(\cdot)$; if a race-r suspect is innocent, θ would be randomly drawn from $f_n^r(\cdot)$. [The subscripts g and n stand for "guilty" and "not guilty," respectively.] Without loss of generality, we can assume that the two densities f_g^r and f_n^r satisfy the strict monotone likelihood ratio property (MLRP), i.e., for $r \in \{C, W\}$,

MLRP: $f_g^r(\theta) / f_n^r(\theta)$ is strictly increasing in θ.

The MLRP property on the signal distributions essentially means that a higher index θ

[16] The model can easily accommodate more races or ethnicities. In the empirical part of the paper, we will examine more racial or ethnic groups: Chinese, Whites, Others, for example.

[17] For the purpose of deriving our empirical test, we will assume that π^r is exogenous.

[18] It is useful to think that the FBI agent aggregates the information he gathers from the investigation index θ by assigning them different weights. The weights the FBI agent assigns to a particular variable, however, can be different for suspects of different ethnicity or race, to the extent that the FBI agents discerns that spies from different ethnic groups differ in how they gather trade secrets. As researchers we do not pretend to know how the FBI agents aggreate the multitude of information into a single index.

is a signal that indicates that the suspect is more likely to be guilty.[19] To the extent that there may be some obviously guilty suspects (for example, the evidence of the stealing of trade secrets is plainly documented in writing, or if there is a confession), we assume that:

Unbounded Likelihood Ratio: $f_g^r(\theta)/f_n^r(\theta) \to +\infty$ as $\theta \to 1$.

The MLRP also implies that the cumulative distribution function $F_g^r(\cdot)$ first order stochastically dominates $F_n^r(\cdot)$, which implies that suspect who are truly guilty are more likely to generate higher and thus more suspicious signals. We think this single dimensional index formulation summarizes the information that is available to the FBI agent when he makes his decision on whether to proceed with charging the suspect in a simple but realistic manner.

An FBI agent can choose to charge a suspect after observing the suspect's vector (r, θ), where r is the suspect's race or ethnicity, and θ is the single-dimensional index that summarizes all the information the FBI agent has gathered so far. We assume that the FBI agent wants to maximize the total number of convictions (or guilty pleas) minus a cost of charging the suspect. This is an important assumption because it requires that an FBI agent will always use any potential statistical information contained in the race of the suspect in his prosecution decisions.[20]

Let $t(r)$ be the cost of an FBI agent recommending a charge on a suspect with race $r \in \{C, W\}$. We normalize the benefit of each successful conviction or guilty plea to equal one, and scale the charging cost to be a fraction of the benefit, so that $t(r) \in (0, 1)$ for $r \in \{C, W\}$.

We now introduce some definitions. First, an FBI agent is said to be *racially prejudiced* if he she exhibits a preference for charging of one race. Following KPT, we model this preference in the cost of charging a suspect.[21, 22]

Definition B.1 An FBI agent is *racially prejudiced*, or has a taste for discrimination, against race-C suspects if $t(C) < t(W)$.

Next, we say that an FBI agent exhibits unfounded statistical belief against race-r suspects if he believes there are more guilty suspects among race r than there actually are.

Definition B.2 A FBI agent exhibits *unfounded statistical belief* against race-r suspects if $\tilde{\pi}^r > \pi^r$.

A. *Theoretical Implications*

[19] For any one dimensional index θ, we can always reorder them according to their likelihood ratio $f_g^r(\theta)/f_n^r(\theta)$ in an ascending order. Thus the MLRP assumption is with no loss of generality.

Let G denote the event that the suspect is either convicted or plead guilty of the espionage charges. When an FBI agent evaluates the decisions of whether to recommend prosecution against a suspect of race r and signal θ, his *subjective* posterior probability that such a suspect may be guilty of stealing trade secret, denoted by $\widetilde{\Pr}(G|r,\theta)$, is obtained via Bayes' rule:

$$\widetilde{\Pr}(G|r,\theta;\tilde{\pi}^r) = \frac{\tilde{\pi}^r f_g^r(\theta)}{\tilde{\pi}^r f_g^r(\theta) + (1-\tilde{\pi}^r) f_n^r(\theta)}, \tag{2}$$

where $\widetilde{}$ is used to indicate that the variable is calculated using the FBI agent's subjective belief $\tilde{\pi}^r$. It immediately follows from the MLRP that $\widetilde{\Pr}(G|r_m,\theta;\tilde{\pi}^r)$ is monotonically increasing in θ. From the unbounded likelihood ratio assumption, we know that $\widetilde{\Pr}(G|r_m,\theta;\tilde{\pi}^r) \to 1$ as $\theta \to 1$.

The problem faced by an FBI agent, when deciding whether to charge a suspect of race r and signal θ is thus as follows:

$$\max\left\{\widetilde{\Pr}(G|r,\theta;\tilde{\pi}^r) - t(r);0\right\} \tag{3}$$

where the first term is the *subjective* expected benefit from charging such a suspect and the second term is the benefit from not charging, which is normalized to zero. Thus the optimal decision for a race r suspect with signal θ if and only if

$$\widetilde{\Pr}(G|r,\theta;\tilde{\pi}^r) \geq t(r).$$

From the monotonicity of $\widetilde{\Pr}(G|r,\theta;\tilde{\pi}^r)$ in θ, we thus conclude:

Proposition B.1 *An FBI agent will charge a race-r suspect if and only if*

$$\theta \geq \theta^*(r;\tilde{\pi}^r)$$

where $\theta^*(r;\tilde{\pi}^r)$ *is uniquely determined by*

$$\widetilde{\Pr}(G|r,\theta^*(r;\tilde{\pi}^r);\tilde{\pi}^r) = t(r). \tag{4}$$

Moreover, the charging threshold $\theta^*(r;\tilde{\pi}^r)$ *is monotonically increasing in* $t(r)$*, and monotonically decreasing in* $\tilde{\pi}^r$*.*

Proposition B.1 says that the perceived probability of a successful prosecution (conviction or guilty plea) for the *marginal* suspect is equal to the cost of prosecution. Any infra-marginal suspect, i.e., suspect whose signal θ is above the threshold $\theta^*(r;\tilde{\pi}^r)$, will have a higher guilt

probability. In what follows, we will refer to $\theta^*(r;\tilde{\pi}^r)$ as the *equilibrium charging criterion* by the FBI for race-r suspects. We define the *equilibrium charging rate* against race-r suspects as $\gamma(r)$, which is given by

$$\gamma(r) = \pi^r\left[1 - F_g^r\left(\theta^*(r;\tilde{\pi}^r)\right)\right] + (1-\pi^r)\left[1 - F_n^r\left(\theta^*(r;\tilde{\pi}^r)\right)\right]. \tag{5}$$

Notice that the equilibrium charging rate is calculated using the true fraction of guilty, π^r, even though the charging threshold $\theta^*(r;\tilde{\pi}^r)$ depends on the FBI agent's perceived fraction of guilty among race-r suspects.

The *equilibrium conviction rate* against race-r suspects, denoted by $S(r;\tilde{\pi}^r,\pi^r)$, is given by

$$S(r) = \frac{\pi^r\left[1 - F_g^r\left(\theta^*(r;\tilde{\pi}^r)\right)\right]}{\pi^r\left[1 - F_g^r\left(\theta^*(r;\tilde{\pi}^r)\right)\right] + (1-\pi^r)\left[1 - F_n^r\left(\theta^*(r;\tilde{\pi}^r)\right)\right]}, \tag{6}$$

where the denominator is the total measure of race-r suspects, regardless of their true guilt, who are prosecuted by the FBI because their signals are above the charging threshold used by the FBI for race-r suspects, namely, those whose signal $\theta \geq \theta^*(r;\tilde{\pi}^r)$; and the numerator is the measure of guilty race-r suspects whose signals are above the charging threshold.

Now we analyze the charging threshold $\theta^*(r;\tilde{\pi}^r)$ as defined by (4). Using Eq. (2), we have

$$\frac{\tilde{\pi}^r f_g^r\left(\theta^*(r;\tilde{\pi}^r)\right)}{\tilde{\pi}^r f_g^r\left(\theta^*(r;\tilde{\pi}^r)\right) + (1-\tilde{\pi}^r) f_n^r\left(\theta^*(r;\tilde{\pi}^r)\right)} = t(r),$$

thus $\theta^*(r;\tilde{\pi}^r)$ must satisfy

$$\ell^r\left(\theta^*(r;\tilde{\pi}^r)\right) = \frac{1-\tilde{\pi}^r}{\tilde{\pi}^r}\frac{t(r)}{1-t(r)} \tag{7}$$

where

$$\ell(\theta) \equiv \frac{f_g^r(\theta)}{f_n^r(\theta)}$$

is the likelihood ratio for the signal distributions. Eq. (7) illustrates that the impacts of $t(r)$ and $\tilde{\pi}^r$ on charging threshold, and subsequently on the equilibrium charging rate (5), are not distinguishable. We state this as a result:

Proposition B.2 *The equilibrium of the model under $(\tilde{\pi}^r, t(r))$ is indistinguishable from that under $\left(\tilde{\pi}^r = \pi^r, \hat{t}(r)\right)$ where*

$$\hat{t}(r) = \frac{\frac{\pi^r}{1-\pi^r}\frac{1-\tilde{\pi}^r}{\tilde{\pi}^r}\frac{t(r)}{1-t(r)}}{1 + \frac{\pi^r}{1-\pi^r}\frac{1-\tilde{\pi}^r}{\tilde{\pi}^r}\frac{t(r)}{1-t(r)}} \in (0,1). \tag{8}$$

It follows from Proposition B.2 that we can without loss of generality focus on a model where the FBI agent's belief regarding the fraction of guilty among race-r suspects is objective, i.e. $\tilde{\pi}^r = \pi^r$. If FBI agents are treating suspects from races differently because they hold unfounded statistical beliefs regarding the fraction of guilty, its impact is no different from that when they have different costs of charging suspects from different racial groups. Note that, from (8), $\hat{t}(r) = t(r)$ if $\tilde{\pi}^r = \pi^r$.

Assumption B.1 FBI agents hold correct belief regarding the true fraction of guilty among race-r suspects, i.e. $\tilde{\pi}^r = \pi^r$.

Definition B.3 We say that the FBI agents have prejudice against the race-r suspects if $\hat{t}(r) < \hat{t}(r')$.

Given the expression for $\hat{t}(r)$ given in (8), an FBI agent could be prejudiced against race-r suspects if $t(r) < t(r')$, or $\tilde{\pi}^r/\pi^r > \tilde{\pi}^{r'}/\pi^{r'}$.

We say that the FBI agents exhibit *statistical discrimination* if they have no taste for discrimination and yet they use different charging criterion against suspects with different races.

Definition B.4 Assume $\hat{t}(C) = \hat{t}(W)$. Then we say that the FBI agents exhibit statistical discrimination if $\theta^*(C) \neq \theta^*(W)$.

When $\hat{t}(C) = \hat{t}(W)$, the FBI agents can still choose to use different charging threshold if $\pi^C \neq \pi^W$. However, as long as the FBI agents do not exhibit prejudice as defined by Definition B.3, it must be the case that the *marginal* suspects prosecuted by the FBI would have the same conviction rate. To see this, note that if the marginal suspect of race-r that will be prosecuted by the FBI has a signal $\theta^*(r)$ that satisfies, following Eq. (7),

$$\ell^r(\theta^*(r)) = \frac{1-\pi^r}{\pi^r}\frac{\hat{t}(r)}{1-\hat{t}(r)}.$$

Rearranging terms, we obtain:

$$\frac{\pi^r \ell^r(\theta^*(r))}{\pi^r \ell^r(\theta^*(r)) + (1-\pi^r)} = \hat{t}(r) \tag{9}$$

where the left hand side is precisely the marginal conviction rate of race-r suspects.

Proposition B.3 *The conviction rate of the marginal cases prosecuted against race-r sus-*

pects is given by $\hat{t}(r)$. *Thus, FBI agents are prejudiced against rae-r if and only if the marginal conviction rate against race-r suspects is lower than that against race-r′ suspects.*

The challenge for implementing Proposition B.3 as the basis of an empirical test for prejudice is that the marginal prosecution cases are hard to determine empirically. In our empirical section, we will use several criteria to decide which cases may be marginal.

It is also useful to use the model to highlight why the equilibrium charging rate $\gamma(r)$, as described by (5), is *not* a suitable basis for empirical test of prejudice. To see this, suppose that the FBI agents do not have racial prejudice, i.e., $\hat{t}(r) = \hat{t}(r')$; in addition, suppose that the signal distributions are identical for the two groups, i.e. $f_g^r(\cdot) = f_g^{r'}(\cdot) = f_g(\cdot)$ & $f_n^r(\cdot) = f_n^{r'}(\cdot) = f_n(\cdot)$. Now suppose but $\pi^r > \pi^{r'}$. From (9), it can be shown that $\theta^*(r)$ decreases in π^r. Thus,

$$\frac{\partial \gamma(r)}{\partial \pi^r} = [F_n(\theta^*(r)) - F_g(\theta^*(r))] - [\pi^r f_g(\theta^*(r)) + (1-\pi^r) f_n(\theta^*(r))] \frac{\partial \theta^*(r)}{\partial \pi^r} > 0.$$

Thus, when $\hat{t}(r) = \hat{t}(r')$, but $\pi^r > \pi^{r'}$, the observed charging rate against race-r suspects will be higher than that against race-r' suspects

Similarly, consider the case of $\pi^r = \pi^{r'}$ but $\hat{t}(r) < \hat{t}(r')$. From (9), it can also be shown that $\theta^*(r)$ is increasing in $\hat{t}(r)$. Thus $\hat{t}(r) < \hat{t}(r')$ implies that $\theta^*(r) < \theta^*(r')$. Thus, from (5), we immediately see that $\gamma(r) > \gamma(r')$. To summarize,

Proposition B.4 *Suppose* $f_g^r(\cdot) = f_g^{r'}(\cdot)$ *&* $f_n^r(\cdot) = f_n^{r'}(\cdot)$ *and that the observed charging rates satisfy* $\gamma(r) > \gamma(r')$. *This could be consistent with both (1)* $\hat{t}(r) = \hat{t}(r')$, *but* $\pi^r > \pi^{r'}$; *and (2)* $\pi^r = \pi^{r'}$ *but* $\hat{t}(r) < \hat{t}(r')$.

In this model, the equilibrium conviction rate $S(r)$ may be used as a basis to test for FBI's racial prejudice, but the test is valid only under more strict conditions. Suppose that $f_g^r(\cdot) = f_g^{r'}(\cdot)$ & $f_n^r(\cdot) = f_n^{r'}(\cdot)$; and suppose that we observe the charging rate is higher against race-r suspects, namely, $\gamma(r) > \gamma(r')$. We can show that if $\gamma(r) > \gamma(r')$ arises under case (2) in Proposition B.4, it must be the case that $S(r) < S(r')$. However, if $\gamma(r) > \gamma(r')$ arises under case (1) in Proposition B.4, it is possible that $S(r) > S(r')$.

First consider case (2): $\pi^r = \pi^{r'}$ but $\hat{t}(r) < \hat{t}(r')$. These, together with the other stated assumptions of Proposition B.4, namely $f_g^r(\cdot) = f_g^{r'}(\cdot)$ & $f_n^r(\cdot) = f_n^{r'}(\cdot)$, imply that $\theta^*(r) < \theta^*(r')$. To show that $S(r) < S(r')$, it suffices to show that

$$k(\theta^*) = \frac{1 - F_g(\theta^*)}{1 - F_n(\theta^*)}$$

is strictly increasing in θ^*. Note that, after some simplification,

$$k'(\theta^*) = \frac{\int_{\theta^*}^{1} [f_n(\theta^*) f_g(\theta) - f_g(\theta^*) f_n(\theta)] d\theta}{[1 - F_n(\theta^*)]^2}.$$

From MLRP, we know that, for all $\theta > \theta^*$, $f_g(\theta)/f_n(\theta) > f_g(\theta^*)/f_n(\theta^*)$, thus the integrand in the numerator is always positive. Hence $k'(\theta^*) > 0$.

Now consider case (1): $\hat{t}(r) = \hat{t}(r')$, but $\pi^r > \pi^{r'}$. These, together with the other stated assumption of Proposition B.4, namely $f_g^r(\cdot) = f_g^{r'}(\cdot)$ & $f_n^r(\cdot) = f_n^{r'}(\cdot)$, imply that $\theta^*(r) < \theta^*(r')$. Moreover, it can be shown that

$$\frac{\partial \theta^*}{\partial \pi^r} = \frac{1}{\pi^r (1 - \pi^r)} \frac{f_g(\theta^*) f_n(\theta^*)}{f_g(\theta^*) f_n'(\theta^*) - f_g'(\theta^*) f_n(\theta^*)} < 0, \tag{10}$$

where the inequality follows from the MLRP assumption, f_g/f_n is strictly increasing in θ. To show $S(r) > S(r')$, it suffices to show that the term

$$\kappa(\pi) = \frac{(1 - \pi)[1 - F_n(\theta^*(\pi))]}{\pi [1 - F_g(\theta^*(\pi))]}$$

is decreasing in π. Note that

$$k'(\pi) = -\frac{1}{\pi^2} \frac{1 - F_n}{1 - F_g} + \frac{1 - \pi}{\pi} \frac{-f_n(1 - F_g) + f_g(1 - F_n)}{(1 - F_g)^2} \partial \frac{\partial \theta^*}{\partial \pi}.$$

After plugging (10) into the above expression, and with some simplifications, it can be shown that $k'(\pi) < 0$ if and only if

$$\frac{h_n(\theta)}{h_g(\theta)}$$

is increasing in θ where $h_n(\theta) \equiv f_n(\theta)/[1 - F_n(\theta)]$ and $h_g(\theta) \equiv f_g(\theta)/[1 - F_g(\theta)]$ are the hazard rate functions of the f_n and f_g distributions.

To summarize,

Proposition B.5 *Suppose $f_g^r(\cdot) = f_g^{r'}(\cdot)$ & $f_n^r(\cdot) = f_n^{r'}(\cdot)$ and that the observed charging rates satisfy $\gamma(r) > \gamma(r')$. We have:*

1. *If $\gamma(r) > \gamma(r')$ results from case (1) $\hat{t}(r) = \hat{t}(r')$, but $\pi^r > \pi^{r'}$, then the conviction rate $S(r) > S(r')$ if $h_n(\theta)/h_g(\theta)$ is increasing in θ;*

2. *If $\gamma(r) > \gamma(r')$ results from case (2) $\pi^r = \pi^{r'}$ but $\hat{t}(r) < \hat{t}(r')$, then $S(r) < S(r')$.*

Proposition B.5 shows that in models with Inframarginality problem, test of racial prej-

udice based on the average conviction rate (or dismiss rate) comparisons needs to be interpreted with caution. The comparison of marginal conviction (or dismiss) rate as described in Proposition B.3 is more informative.

Appendix C: Additional Tables and Figures

Table C1: Defendants by Ethnicity: PACER Sample vs. Press Release Sample

	PACER		Press Release	
	No.	%	No.	%
Westerner	147	0.439	20	0.270
Chinese	111	0.331	43	0.581
Other Asian	29	0.087	9	0.122
Hispanic	10	0.030	0	0
Middle Eastern	6	0.018	0	0
Unknown	1	0.003	0	0
Firm	31	0.093	2	0.027
Total	335		74	

Table C2: Outcome Test: Defendants Indicted under U.S.C. §1832

	Chinese vs. Others		Chinese vs. Westerners	
	Diff.	t-value	Diff.	t-value
Total # of counts indicted	1.899**	2.160	2.205**	2.311
# of EEA counts indicted	0.971*	1.849	0.991*	1.911
# of non-EEA counts indicted	0.928	1.386	1.214	1.638
Observations	360		287	
Conditional on the case terminated				
Total # of counts indicted	2.307**	2.174	2.511**	2.218
# of EEA counts indicted	1.518**	2.554	1.492**	2.555
# of non-EEA counts indicted	0.789	0.963	1.018	1.151
Total # of counts guilty	-0.336	-1.222	-0.269	-1.034
# of EEA counts guilty	-0.181	-1.260	-0.250	-1.599
# of non-EEA counts guilty	-0.154	-0.676	-0.0190	-0.0992
% of counts guilty	-0.287***	-5.200	-0.309***	-5.431
% EEA counts guilty	-0.253***	-4.270	-0.294***	-4.812
Case dismissed	0.172***	3.176	0.186***	3.284
Guilty of EEA charges	-0.173***	-2.708	-0.213***	-3.207
Observations	291		237	
Conditional on guilty				
Probation	-0.224***	-2.953	-0.239***	-3.052
Observations	224		182	
Conditional on imprisonment				
# of months imprisonment	13.26**	2.377	13.21**	2.161
Observations	117		95	
Conditional on probation				
# of months probation	2.276	0.424	3.398	0.628
Observations	88		71	
Conditional on pleading guilty				
Probation	-0.276***	-3.253	-0.290***	-3.336
# of months imprisonment	12.43***	3.692	12.55***	3.505
# of months probation	-7.164*	-1.812	-7.290*	-1.807
Observations	189		153	
Conditional on not pleading guilty				
Probation	0.0644	0.410	0.0505	0.298
# of months imprisonment	20.74	1.307	21.09	1.210
# of months probation	-1.300	-0.205	-0.800	-0.132
Observations	35		29	

Note:

Table C3: Outcome Test Robustness: PACER Sample

	Chinese vs. Others		Chinese vs. Westerners	
	Diff.	t-value	Diff.	t-value
Total # of counts indicted	2.590***	2.605	3.130***	2.760
# of EEA counts indicted	2.334***	3.635	2.508***	3.624
# of non-EEA counts indicted	0.255	0.356	0.623	0.750
Observations	330		253	
Conditional on the case terminated				
Total # of counts indicted	2.527**	2.135	3.115**	2.379
# of EEA counts indicted	2.129***	3.273	2.309***	3.526
# of non-EEA counts indicted	0.397	0.441	0.806	0.796
Total # of counts guilty	-0.0899	-0.293	0.0833	0.274
# of EEA counts guilty	0.0594	0.340	0.0896	0.483
# of non-EEA counts guilty	-0.149	-0.618	-0.00631	-0.0288
% of counts guilty	-0.274***	-4.734	-0.271***	-4.395
% EEA counts guilty	-0.237***	-3.816	-0.254***	-3.882
Case dismissed	0.152***	2.922	0.114**	2.045
Guilty of EEA charges	-0.109	-1.642	-0.112	-1.602
Observations	258		204	
Conditional on guilty				
Probation	-0.286***	-3.842	-0.289***	-3.774
Observations	211		168	
Conditional on imprisonment				
# of months imprisonment	18.17***	2.939	18.01**	2.592
Observations	112		91	
Conditional on probation				
# of months probation	6.174	1.019	8.205	1.365
Observations	80		61	
Conditional on pleading guilty				
Probation	-0.300***	-3.620	-0.303***	-3.551
# of months imprisonment	11.55***	3.428	11.14***	3.000
# of months probation	-7.641**	-1.990	-7.086*	-1.823
Observations	179		143	
Conditional on not pleading guilty				
Probation	-0.173	-1.081	-0.167	-1
# of months imprisonment	48.62***	2.816	49.20**	2.473
# of months probation	-8.400	-1.152	-6	-0.947
Observations	32		25	

Table C4: Outcome Test Robustness: Corporate Defendant Recoded

	Chinese vs. Others		Chinese vs. Westerners	
	Diff.	t-value	Diff.	t-value
Total # of counts indicted	2.406***	2.698	3.237***	3.488
# of EEA counts indicted	1.232**	2.361	1.760***	3.370
# of non-EEA counts indicted	1.174*	1.691	1.476**	1.998
Observations	409		354	
Conditional on the case terminated				
Total # of counts indicted	2.359**	2.359	2.823***	2.700
# of EEA counts indicted	1.512***	2.708	1.744***	3.252
# of non-EEA counts indicted	0.847	1.109	1.079	1.327
Total # of counts guilty	-0.186	-0.695	-0.0701	-0.277
# of EEA counts guilty	-0.0564	-0.364	-0.0741	-0.444
# of non-EEA counts guilty	-0.129	-0.615	0.00394	0.0228
% of counts guilty	-0.276***	-5.318	-0.288***	-5.313
% EEA counts guilty	-0.239***	-4.272	-0.269***	-4.648
Case dismissed	0.147***	2.931	0.137**	2.589
Guilty of EEA charges	-0.148**	-2.449	-0.167***	-2.671
Observations	306		265	
Conditional on guilty				
Probation	-0.218***	-3.145	-0.283***	-3.963
Observations	239		206	
Conditional on imprisonment				
# of months imprisonment	14.69**	2.567	14.57**	2.298
Observations	126		104	
Conditional on probation				
# of months probation	3.576	0.738	0.561	0.106
Observations	91		81	
Conditional on pleading guilty				
Probation	-0.272***	-3.513	-0.320***	-4.048
# of months imprisonment	10.55***	3.351	11.90***	3.628
# of months probation	-7.188**	-1.993	-9.682**	-2.524
Observations	201		173	
Conditional on not pleading guilty				
Probation	0.0774	0.529	-0.0692	-0.424
# of months imprisonment	27.77*	1.707	35.43*	2.009
# of months probation	1.654	0.260	-7.200	-1.027
Observations	38		33	

Table C5: Marginal Cases: Case Outcome and Defendant Ethnicity

	Definition 1		Definition 2	
	Diff	t-value	Diff	t-value
Panel A: Defendants in Terminated Cases				
Total # of counts guilty	-0.868	-1.586	-0.643	-1.297
# of EEA counts guilty	-0.279	-0.753	-0.168	-0.507
% of counts guilty	-0.249**	-2.230	-0.187*	-1.797
% EEA counts guilty	-0.144	-1.223	-0.0921	-0.858
Case dismissed	-0.0895	-0.680	0.00676	0.0556
Guilty of EEA charges	0.0544	0.373	0.103	0.775
Observations	49		57	
Panel B: Guilty Defendants				
Total # of counts guilty	-1.343*	-2.009	-0.843	-1.356
# of EEA counts guilty	-0.467	-0.978	-0.217	-0.508
% of counts guilty	-0.378***	-3.047	-0.242*	-1.926
% EEA counts guilty	-0.235	-1.642	-0.12	-0.891
Observations	36		43	

Table C6: Marginal Cases: Sentencing Outcome and Defendant Ethnicity

	Definition 1		Definition 2	
	Diff	t-value	Diff	t-value
Panel A: Guilty Defendants				
Probation	-0.476***	-3.204	-0.417***	-2.846
# of months imprisonment	29.67	0.722	21.67	0.608
# of months probation	15	1.585	16.95*	1.923
Observations	36		43	
Panel B: Defendants Pleaded Guilty				
Probation	-0.439**	-2.676	-0.365**	-2.280
# of months imprisonment	7.525	1.048	5.425	0.667
# of months probation	1.067	0.111	3.952	0.461
Observations	30		37	
Panel C: Defendants Convicted at Trial				
Probation	-0.750	-2	-0.750	-2
# of months imprisonment	143***	6.719	143***	6.719
# of months probation	-36	-1.633	-36	-1.633
Observations	6		6	