Exporting the Surveillance State via Trade in AI

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Abstract

We document three facts about the global diffusion of surveillance AI technology, and in particular, the role played by China. First, China has a comparative advantage in this technology. It is substantially more likely to export surveillance AI than other countries, and particularly so as compared to other frontier technologies. Second, autocracies and weak democracies are more likely to import surveillance AI from China. This bias is not observed in AI imports from the US or in imports of other frontier technologies from China. Third, autocracies and weak democracies are especially more likely to import China's surveillance AI in years of domestic unrest. Such imports coincide with declines in domestic institutional quality more broadly. To the extent that China may be exporting its surveillance state via trade in AI, this can enhance and beget more autocracies abroad. This possibility challenges the view that economic integration is necessarily associated with the diffusion of liberal institutions.

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1 Introduction

Artificial intelligence (AI) technology has been hailed as the basis for a "fourth industrial revolution" (Schwab, 2017) that will drive economic growth in the years to come (Aghion et al., 2018, Brynjolfsson et al., 2021). But the technology has also brought new challenges to the fore. It might undermine democracies (Acemoglu, 2021), enhance autocrats' aims of social control (Guriev and Treisman, 2019, Tirole, 2021), and empower "surveillance capitalists" (Zuboff, 2019). China, in particular, has used facial recognition AI as a key technology to support its surveillance state (Beraja et al., 2023).

In this paper, we study the global diffusion of surveillance AI technology, and in particular, the role played by China. We collect novel data on global trade of facial recognition AI and document three facts:

1. China has a comparative advantage in facial recognition AI. It is more likely to export this surveillance technology than other countries, and especially so as compared to other frontier technologies.

2. Autocracies and weak democracies are more likely to import facial recognition AI from China. No such bias is observed in AI imports from the US or in imports of other frontier technologies from China.

3. Autocracies and weak democracies are especially more likely to import facial recognition AI from China in years when they experience domestic unrest. These imports coincide with the erosion of domestic political institutional quality more broadly.

China's comparative advantage (fact 1) could stem in part from Chinese exporters' benefiting from the government's demand for AI to support its surveillance state, a form of "home-market" effect (Linder, 1961), as well as access to large government datasets (Beraja et al., 2022) or explicit industrial policy (Liu, 2019). The bias in AI imports from China (facts 2 and 3) reflects in part higher demand in autocracies and weak democracies for surveillance technology.[1] To the extent that

[1] Additional contributors include other demand side factors in importing countries (e.g., the desire to attract a broad package of Chinese development spending), as well as supply side factors in China (e.g., subsidies to exports to autocracies and weak democracies as part of its foreign policy) and in exporting countries (e.g., the US and European companies sanction their AI exports).

China may be exporting its surveillance state via trade in AI, these facts imply that the rise of China as a technological leader may enhance and beget more autocracies abroad.[2] More generally, they challenge the conventional view that economic integration is necessarily associated with the diffusion of liberal institutions.

To document our facts, we collect global data on facial recognition AI trade spanning 2008-2021 based on the Carnegie Endowment for International Peace's report *The Global Expansion of AI Surveillance* (Feldstein, 2019). The report compiles information from AI companies' announcements of overseas AI deals, either with state or non-state actors.[3] We complement this set of deals with our own search of AI trade deals from all facial recognition AI firms identified in the Capital IQ database. These data are aggregated to the exporter-importer-year level. For comparison, we construct analogous data of trade in other frontier technologies, such as robotic and genomic products, from the UN Comtrade database.

To identify China's comparative advantage in surveillance AI technology (fact 1), we estimate several linear probability models that predict trade in AI or other frontier technologies between country pairs. Differencing out trade in other frontier technologies allows us to account for other unobserved factors associated with country-pairs trading more in frontier technologies generally. We find that China is more likely to export facial recognition AI than other countries, and particularly so as compared to other frontier technologies. For instance, we observe 250 Chinese export deals of facial recognition AI, the most out of all countries (the US is second with 215 deals). In no other frontier technology does China exhibit such exporting dominance.

We next examine the regime types of the importers of surveillance AI (fact 2). We find that autocracies and weak democracies are substantially more likely to import China's surveillance AI technology. For example, we observe that 44% of China's export deals are with autocracies and weak democracies, while only 24%

[2]This possibility has been suggested in the case of Myanmar (as reported by Reuters, source: `https://www.reuters.com/world/china/fears-digital-dictatorship-myanmar-deploys-ai-2021-03-18/`), Uganda and Zambia (as reported by the Wall Street Journal, source: `https://www.wsj.com/articles/huawei-technicians-helped-african-governments-spy-on-political-opponents-11565793017?ns=prod/accounts-wsj`), as well as in policy reports (Greitens, 2020).

[3]Both the state and non-state actors could contribute to the building of a surveillance state. Non-state sectors often act as local intermediaries from which the government procures imported products.

of US exports are with those countries. These patterns are particularly striking given the generally higher income and higher trade volumes of (strong) democratic regimes. Such political bias is not seen in AI imports from the US or in imports of other frontier technologies from China.

We then examine the impact of domestic political unrest on AI imports from China (fact 3). We find that autocracies and weak democracies are differentially more likely to import China's surveillance AI technology in years of greater political unrest. Importantly, there is no evidence of differential pre-trends of AI imports leading up to domestic political unrest, suggesting a causal effect of domestic unrest on AI imports. Greater imports from China in years of domestic political unrest are only observed in facial recognition AI technology, but not other frontier technologies; and these patterns are not observed among mature democracies. These results suggest the particular value of China's surveillance AI technology for surveillance purposes, demanded under specific political regime types and particular political circumstances.

Lastly, we document that the imports of Chinese surveillance AI technology occurs alongside other measures associated with political control and repression, and the entrenchment of non-democratic regimes. For example, we observe a lower likelihood of opposition parties being allowed to run, or a lower likelihood of having fair and unbiased media. This finding suggests that as part of autocracies and weak democracies' concerted efforts to consolidate political control, they turn specifically to China's facial recognition AI technology which was developed there to achieve similar goals. However, we do not find any erosion in domestic electoral institutional quality when China's surveillance AI is imported by mature democracies. As such, the global diffusion of surveillance AI technology might contribute to divergent institutional paths between mature democracies *vis-a-vis* autocracies and weak democracies.

Our finding of China's comparative advantage in facial recognition AI suggests a political dimension to the "home-market effect" (Linder, 1961; Krugman, 1980; Costinot et al., 2019). In particular, we show that the Chinese government's demand for surveillance and political control translates into more exports of AI, thus highlighting an instance of domestic political institutions shaping comparative advantage. This contributes to a broad literature on the impact of institutions on international trade (see Nunn and Trefler, 2014 for a review). Much work in this

literature has focused on how institutions shape patterns of trade through property rights protection, contract enforcement, or the rule of law more broadly (see Berkowitz et al., 2006, Levchenko, 2007, and Nunn, 2007). Complementing these supply side factors, our work highlights a demand side institutional factor that influences trade.[4]

The political bias of AI imports from China suggests a novel mechanism through which domestic autocratic institutions may diffuse abroad. Traditional views emphasize how ideology and correlated shocks shape political transition in waves — a so-called *domino* effect in the spread of democracy (Huntington, 1993) and of autocracy (Ninkovich et al., 1994). Recent work highlights that the spread of (democratic) ideology through trade integration with other democracies could account for domestic democratization (Tabellini and Magistretti, 2023). Our results suggest an autocratic analog to the international institutional spillover through trade. Moreover, we demonstrate a distinct mechanism — a technology used for domestic surveillance can affect institutions abroad via its export, potentially enhancing autocracies elsewhere and triggering weak democracies to move towards autocracies.[5] As such, our paper also relates to the literature on the impact of trade with China (Autor et al., 2016), especially on domestic politics (Autor et al., 2020), and to the literature on how governments should respond to automation technologies like AI (Costinot and Werning, 2022; Korinek and Stiglitz, 2020; Beraja and Zorzi, 2022).

2 Data sources

Trade in facial recognition AI technology. We begin constructing our database of AI trade deals with the bibliography of the Carnegie Endowment for International Peace's report *The Global Expansion of AI Surveillance* (Feldstein, 2019). This bibliography focuses on international procurement of AI surveillance technology

[4]Our finding that autocrats and would-be autocrats abroad demand surveillance technology from China suggest that political factors may affect the direction of AI innovation (Habakkuk, 1962; Acemoglu, 2007).

[5]Other technologies with political implications include the printing press (Dittmar, 2011), radio (e.g., Olken, 2009; DellaVigna et al., 2014; Yanagizawa-Drott, 2014), and information and communications technologies such as mobile phones (Manacorda and Tesei, 2020) and 3G internet (Guriev et al., 2021).

by governments, containing 1,300 citations spanning 75 importing countries.[6]

For each item in the bibliography, we develop a web scraper to collect the source text.[7] We then use Stanza (Qi et al., 2020), a Python NLP (Natural Language Processing) and NER (Named Entity Recognition) package developed by the Stanford NLP Group, to identify key variables from each source: the exporting country, importing country, year of the deal, exporting company, and whether the deal concerns smart city technology. At least one research assistant then validated whether each source contains an actual AI trade deal, as well as each of the deal characteristics described above.[8] Out of the 1,300 citations, we confirm that 313 of them reference AI trade deals.

Since the Carnegie report was only intended to provide an overview of the industry and is not a comprehensive record of all AI trade deals, we use these trade deals as a starting point to explore the universe of potential trade deals.[9] To do so, we search through the website of every firm that appears in the report, as well as references to them in the news/media, and collect any references to potential AI trade. There are 15,351 such sources. We collect deal-level information from each source following the procedure outlined above: a web-scraper collects the text, Stanza's NER identifies whether this is an AI trade deal and documents important deal characteristics, and then a human verifies each entry and cleans the output as needed. This ensures that we do not flag any trade deals as false positives. We use Google as a test company to ensure that our procedure misses relatively few AI trade deals: we manually check all 206 sources flagged as non-AI trade deals and find only 2 false negatives.[10] At this point, we find 1,377 AI trade deals from

[6]The original bibliography is accessible at `https://www.zotero.org/groups/2347403/global_ai_surveillance/library`.

[7]Some sources pointed to images and others contained references in non-English languages. For the former, we used Google's Tesseract-OCR engine to obtain the source text, and for the latter, Google Translate.

[8]We follow the guidelines in The OECD Handbook on Measuring Digital Trade (González and Jouanjean, 2017) to resolve potentially ambiguous instances of trade in AI.

[9]As the report notes: "Given limited resources and staffing constraints (one full-time researcher plus volunteer research assistance), the index is only able to offer a snapshot of AI surveillance levels in a given country." All of our results are robust to using only the trade deals identified in the Carnegie report sources. See Appendix Tables A.2 to A.4.

[10]This procedure extends our dataset from the business-to-government deals identified in the Carnegie report to also include business-to-business (B2B) trade deals. For our analysis, we use the total number of deals between two countries, since many B2B sales are government sub-contracts or could reasonably be associated with government procurement due to local regulations.

36 exporting countries to 132 importing countries.

Given the focus of the report on raising awareness of "surveillance states", one may be concerned that the Carnegie report contains a biased sample of companies. To address this concern, we collect a list of all facial recognition AI companies from Capital IQ, which is the S&P's financial database covering global public and private firms. There are 2,878 companies in this list. For each new company in this list, we follow the process outlined above and collect data on whether these companies export their technology to other countries. By combining these sets of trade deals, we create a comprehensive database of trade in facial recognition AI.

In all, we find 1,636 AI trade deals from 36 exporting countries to 136 importing countries. China is the largest exporter of AI with 250 trade deals, while the United States is the second largest exporter with 215 deals. When restricting analysis to smart city trade deals, China remains the largest exporter with 158 trade deals, while Germany is the second largest exporter with 124 deals. For the remainder of our analysis, we restrict our sample of exporters and importers to the top 100 countries by GDP, given the sparsity of trade in AI outside of this sample. In this sample, we find 1,488 AI trade deals from 33 exporting countries to 92 importing countries. China remains the largest exporter of AI with 238 trade deals, while the United States is the second largest exporter with 211 deals. Examples from our dataset include trade deals titled "Safe City Service Brings the Future to Laos: Huawei case studies" (China exporting to Laos in 2015), "Bosch equips Hong Kong-Zhuhai-Macao Bridge with customized security solutions" (Germany exporting to China in 2018), and "Digital Intelligence is Helping Brazil's Federal Police Seize Millions in Assets to Bring Down Drug-Smuggling Kingpins" (Israel exporting to Brazil in 2020). It is important to note that firms issue press releases even when selling to regimes that may be perceived as problematic. In Appendix Figure A.1 we provide press releases from US and Chinese companies announcing deals with Kuwait and Saudi Arabia, respectively. Table 1 shows summary statistics at the importing country level. We plot the number of AI trade deals over time in Appendix Figure A.2. Bar charts of the top exporters and importers in AI trade are displayed in Appendix Figures A.3 - A.4.

Frontier trade and country characteristics. We collect data on trade in frontier technologies from the UN Comtrade database. Our fields of frontier technology

Table 1: Summary statistics

	All	Strong democracies	Weak democracies/ autocracies
	(1)	(2)	(3)
Panel A: AI trade			
Total AI import deals	13.2	18.2	8.5
	(23.6)	(32.3)	(8.5)
AI import deals from China	1.9	1.6	2.2
	(2.5)	(2.7)	(2.2)
AI import deals from USA	1.6	2.4	0.8
	(2.7)	(3.4)	(1.4)
Total smart city import deals	10.4	14.7	6.4
	(20.1)	(27.6)	(7.1)
Smart city import deals from China	1.2	1.0	1.4
	(1.6)	(1.7)	(1.5)
Smart city import deals from USA	1.1	1.8	0.4
	(2.1)	(2.8)	(0.9)
N	100	48	52
Panel B: Institutions and political events			
Institutional quality index	-0.1	0.3	-0.4
	(0.7)	(0.5)	(0.6)
Total unrest events	5951.4	6668.9	5289.1
	(16893.6)	(23487.6)	(6683.2)
N	100	48	52
Panel C: Economic conditions			
Log(GDP)	25.3	25.9	24.8
	(1.6)	(1.7)	(1.2)
Log(total trade)	22.0	22.3	21.8
	(1.4)	(1.5)	(1.3)
Log(frontier trade)	17.0	17.2	16.7
	(1.6)	(1.7)	(1.4)
N	100	48	52

Notes: This table presents sample means and standard deviations of key variables, aggregated at the import country level. Column 1 contains statistics for the top 100 countries by GDP, column 2 restricts the sample to strong democracies, and column 3 restricts the sample to weak democracies and autocracies. A Polity score of 7 is used as the cutoff for a 'full democracy' by the Polity IV project (Marshall et al., 2016), which we use to distinguish mature and weak democracies.

are the 10 technologies identified in the OECD Science, Technology, and Innovation Outlook (OECD, 2018): artificial intelligence, the internet of things, virtual reality/augmented reality, drones, robotics, autonomous vehicles, space, genomics, neuroscience, and blockchain technology. We then find 16 SITC codes that are most

closely associated with these frontier technologies, and collect information on the volume of trade at the country dyad level from the years 2000-2020.[11] Notably, there is no SITC code associated with artificial intelligence.[12]

We also collect data on country dyad characteristics (distance between countries, whether they share a common border, free trade agreement, colonial history, legal system, language, or religion), sourced from Helpman et al. (2008). Data on country level GDP come from the World Bank, data on AI investment by country from NetBase Quid, and data on regime type from the Polity IV Project. Aid data on China comes from Custer et al. (2021) and aid data on the rest of the world comes from the OECD. Finally, we collect data on Chinese foreign investment and construction from the American Enterprise Institute's China Global Investment Tracker and data on the global arms trade from the SIPRI Arms Transfers Database.

Political unrest. We collect data on political unrest from the Global Database of Events, Language, and Tone (GDELT) Project. The GDELT project records instances of events based on articles from a global, comprehensive set of news feeds.[13] In sum, we find 18,449,402 events across the world indicating political unrest.[14] Sample headlines indicating unrest include "Laos: Police arrests 8 activists planning to stage protests to condemn land grabs and dam projects, later releases 6 of them," "Two more monks arrested in Ngaba county for calling freedom in Tibet," and "Brazil's President Rousseff Rocked by Anti-Government Protests." Combin-

[11] In particular, these SITC codes are: 525, 541, 712, 716, 718, 728, 731, 772, 774, 776, 781, 792, 872, 874, 884, and 899. These 10 technologies are commonly associated with frontier technology. For instance, the UN's 2018 report "Frontier technologies for sustainable development" (ESCAP, 2018) identifies and analyzes the same 10 technologies.

[12] One may be concerned about the comparability of data between trade in AI and other frontier trade. We therefore focus our analysis on the extensive margin of trade (whether two countries engage in trade in a sector of frontier trade), which should be more comparable between the data, instead of the intensive margin (number of trade deals). However, our main results all replicate using the number of trade deals as the outcome. See Appendix Tables A.5 to A.7.

[13] Text analysis and machine learning methods are applied to the contents of these articles to identify salient characteristics, such as event location, date of the event, and the nature of these events. When multiple news sources cover the same event, GDELT records only one event. See `https://www.gdeltproject.org` for a detailed description of the GDELT Project and its methodology.

[14] Each event is classified under the Conflict and Mediation Events Observations (CAMEO) event and actor codebook. Twelve of the twenty top-level "verbs" that an event can be classified under indicate political unrest: protests, sanctions, violence, investigations, demands, disapproval, rejections, threats, coercion, assault, fights, and unconventional mass violence.

ing the GDELT data with the data above, we obtain panel data at the country-year level on the amount of AI trade, non-AI frontier trade, and political unrest in a country.

Institutional type and quality. We categorize broad institutional types using Polity Scores from the Polity IV Project. Specifically, following Marshall et al. (2016), we classify regimes as autocracies and weak democracies (those with a Polity Score below 6), in contrast with mature democracies (those with a score greater than or equal to 7).

We also measure political institutional quality using indices from the National Elections Across Democracy and Autocracy Dataset 6.0 (NELDA), constructed by Hyde and Marinov (2012). These indices measure four broad categories of electoral-based institutional quality where regimes not holding any elections receive the lowest score: *(i)* fair elections (the opposition is allowed to run, the opposition is not harassed); *(ii)* no media bias; *(iii)* peaceful elections; and *(iv)* election monitors. We present the full list of disaggregated measures and the index categories to which they belong in Appendix Table A.1. In addition to these disaggregated indices, we pool all variables and construct an overall index for institutional quality (inverse covariance weighted across all disaggregated indices). The Polity Scores and the NELDA index are highly correlated cross-sectionally (correlation coefficient = 0.348). However, the NELDA index captures distinct over-time variation while the Polity Scores are relatively stable: conditional on country fixed effects, the correlation coefficient drops to 0.178. Finally, we collect data on regime changes from V-Dem's Episodes of Regime Transformation (ERT) dataset (Edgell et al., 2023).

3 China's comparative advantage in facial recognition AI

A first indication of China's comparative advantage in facial recognition AI can be seen in the number of countries to which China exports the technology. In Figure 1, we map the export deals from the two largest producers and exporters: China in Panel A and the US in Panel B. Between 2008 and 2021, we observe that China

exports to roughly twice as many countries as the US (83 versus 57 links) and has about 10% more trade deals (238 versus 211).

To examine China's comparative advantage more rigorously, we compare China's exports of facial recognition AI to the rest of the world, relative to their exports of other frontier technologies. Specifically, we estimate the following equation:

$$trade_{ijs} = \beta_0 + \beta_1 \mathbf{1}_{i=\text{China}} + \beta_2 \mathbf{1}_{s=\text{AI}} + \beta_3 \mathbf{1}_{i=\text{China},s=\text{AI}} + X_{ij} + u_{ijs}, \quad (1)$$

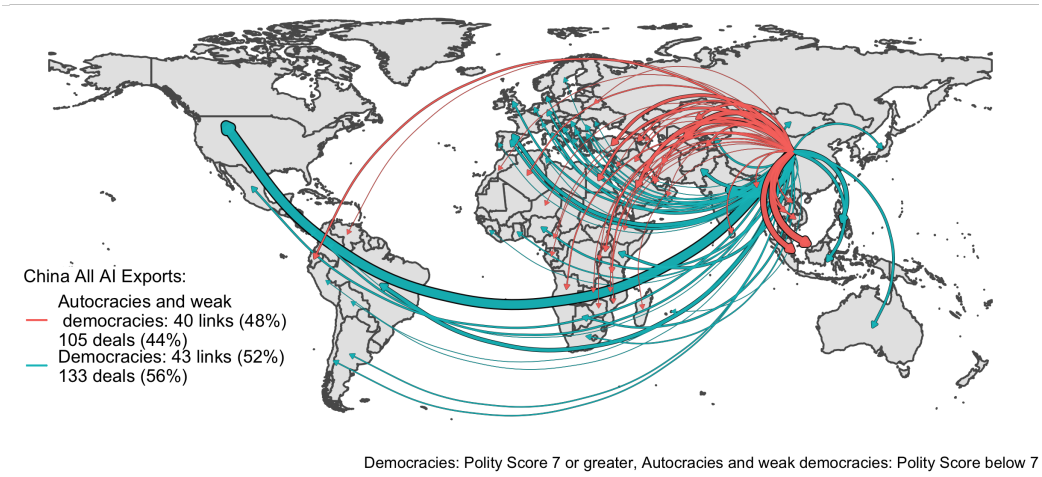
where $trade_{ijs}$ denotes a trade link in technology sector (s) between exporting country (i) and importing country (j), and X_{ij} are a vector of controls at the country-pair level. The coefficient β_1 indicates the difference in exports of non-AI frontier technologies between China and the rest of the world (which is the omitted category). The coefficient β_2 indicates the difference between the exports from the rest of the world in AI and its exports of other frontier technologies. Finally, the coefficient β_3 indicates the differential export of China's AI, relative to other frontier technologies and the rest of the world.

We present the results in Table 2. China's exports of non-AI frontier technology are very similar to that of the rest of the world — β_1 is approximately zero — once we account for countries' GDP and distance. However, China is more likely to export AI than other frontier technologies relative to the rest of the world — β_3 is significantly greater than zero. The magnitude of the coefficient implies that the propensity for Chinese AI exports is 47.4 percentage points greater (at the country-pair level) than Chinese exports of other frontier technologies.[15] These results hold for specifications that control for a range of other country-pair characteristics that influence trade; including having trade agreements or a common border, as well as institutional characteristics such as having a common language, legal system, or religion. We observe similar patterns focusing only on imports of smart city AI technology, the flagship urban surveillance tools (see Appendix Table A.8). These results also hold restricting the sample to the two largest exporting countries: in Appendix Table A.9, we replicate Table 2, but now comparing China with only the US. We again find that China is differentially more likely to export more AI than other frontier technologies.

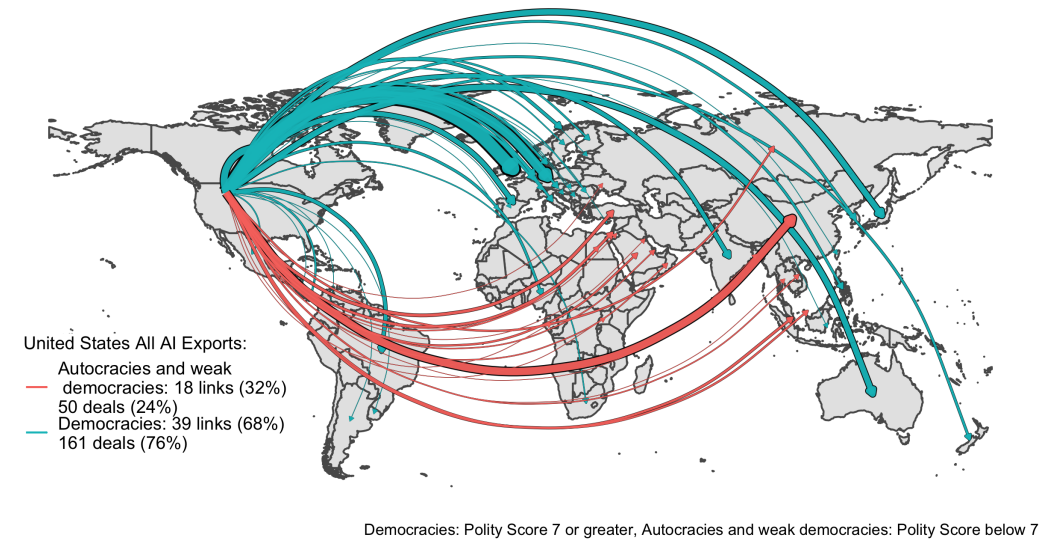
[15] In making these comparisons, it is worth noting that the trade deals are similar in dollar values: the median contract size for Chinese AI export deals is US$22.5 million, and the median for non-China deals is US$ 21.5 million. We acknowledge the caveat that we only observe such values for around 5% of the deals and we do not observe "units" or other attributes of the deals.

Figure 1: Surveillance AI exports from China and the US

Panel A: China



Panel B: United States



Note: These figures display trade links and number of export deals in AI from China (Panel A) and the United States (Panel B) to the rest of the world. A thicker arrow represents more deals. Exports to autocracies and weak democracies (polity score under 7) are displayed in red. Exports to mature democracies (polity score greater than or equal to 7) are in blue.

Table 2: China vs. rest of world, AI vs. frontier technologies

	Engage in trade			
	(1)	(2)	(3)	(4)
Origin China	-0.026	-0.026	-0.012	-0.026
	(0.024)	(0.024)	(0.025)	(0.024)
AI	-0.356***	-0.357***	-0.355***	-0.355***
	(0.010)	(0.010)	(0.010)	(0.010)
Origin China X AI	0.474***	0.475***	0.461***	0.475***
	(0.030)	(0.030)	(0.030)	(0.030)
N	402300	402300	402300	402300
Log importer/exporter GDP	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No
Institutional characteristics	No	No	Yes	No
Geographical characteristics	No	No	No	Yes

Notes: Regressions are at the product-import-export country dyad level. Outcome is dummy for trade. Omitted: not China X not AI. All columns control for importer/exporter GDP and log distance. Column (2) adds controls for common border, free trade agreements, and shared colonial background. Column (3) adds controls for common language, legal system, and religion. Column (4) adds controls for landlocked and island characteristics. Standard errors are clustered by origin country. * significant at 10% ** significant at 5% *** significant at 1%.

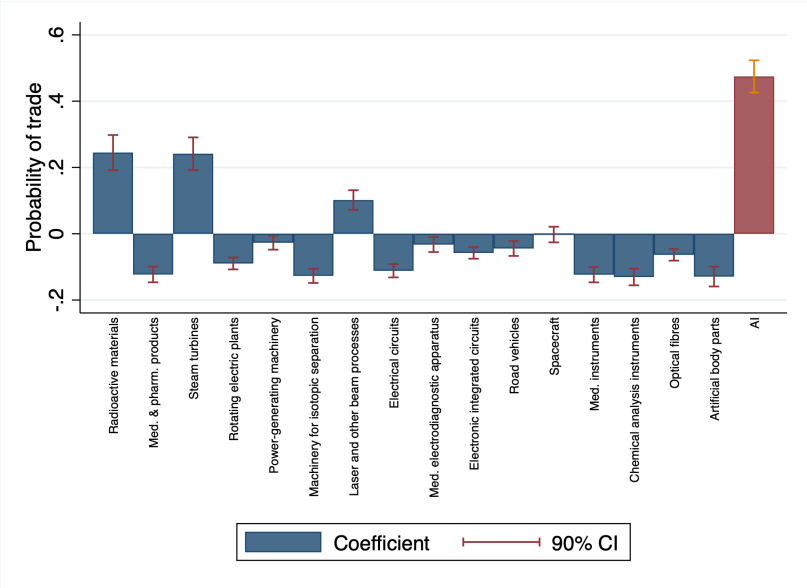
In the baseline analysis above, we compare AI technology exports with all non-AI frontier technology trade aggregated together. To illustrate how AI technology differs from other frontier technology, we repeat the baseline analysis but now estimate China's differential exports in technology sector s, one frontier technology sector at a time. We plot the β_3 coefficients for each frontier technology sector s in Figure 2. One observes that China also exhibits moderate comparative advantage in the production of radioactive and associated materials, steam turbines, and laser and other beam processes. However, China's comparative advantage in facial recognition AI technology stands out.

3.1 What contributes to China's comparative advantage?

Many factors may have contributed to the Chinese comparative advantage in the facial recognition AI industry that we document. We highlight two salient factors below.

The Chinese regime has explicitly stated that becoming a world leader in AI is

Figure 2: China vs. rest of world, frontier technology exports



Note: The figure follows the specification in Table 2 and presents the coefficient and 90% confidence interval for the interaction term (Origin China X frontier technology) for each of the different frontier technologies.

one of their key development and strategic goals.[16] In practice, this has meant that AI firms receive generous government subsidies and are recipients of a variety of AI-related industrial and innovation policies.[17] A range of government incentives to train and recruit AI talent are in place as well.

Moreover, the facial recognition AI industry in particular has also directly benefited from government demand for surveillance technology and firms' access to large-scale government datasets. In Beraja et al. (2023, 2022) we have shown that AI procurement by public security agencies (e.g., municipal police departments) stimulates firm innovation and development of a variety of new products. In part, such procurement has been motivated by the local agencies' desire to suppress political unrest, and the stimulus has come from firms gaining access to valuable government data to train AI algorithms (e.g., surveillance video from street cameras).

[16]Examples of landmark policies in AI set by China include the "'Internet +' Three-Year Implementation Plan" in 2016, the "New Generation Artificial Intelligence Development Plan' in 2017, and the "National New Generation of AI Standardization Guidance" in 2020.

[17]For a list of tax incentives, see for instance: `https://www.china-briefing.com/news/tax-incentives-china-to-encourage-technology-innovation-updated/`.

Indeed, we found that the firms winning such public security contracts became more likely to export.

4 Who imports China's AI technology?

Having established China's comparative advantage in facial recognition AI technology, we next explore the characteristics of the importers of such technology.

4.1 Domestic political institutions

We begin by considering the possibility that autocracies and weak democracies are more likely to import facial recognition AI from China. A first indicator of such a bias can be seen in Figure 1. The AI exports of the US (in terms of both country links and number of trade deals) are concentrated in mature democracies, perhaps reflecting the fact that these countries are in general richer. In contrast, China's AI exports country links and trade deals are nearly equally split between mature democracies or autocracies and weak democracies.

To investigate this more formally, we examine whether autocracies and weak democracies differentially import China's AI technology (relative to other frontier technologies). We estimate the following regression model:

$$trade_{i=\text{China},js} = \beta_0 + \beta_1 \mathbf{1}_{j=\text{low Polity Score}} + \beta_2 \mathbf{1}_{s=\text{AI}} + \beta_3 \mathbf{1}_{j=\text{low Polity Score},s=\text{AI}} + X_{i=\text{China},j} + u_{js}, \quad (2)$$

where the unit of analysis is the technology (s) by the importing country (j), and X_{ij} are a vector of controls at the country-pair level.[18] In particular, the coefficient on the interaction β_3 indicates the differential import of AI from China by autocracies and weak democracies relative to other frontier technologies.

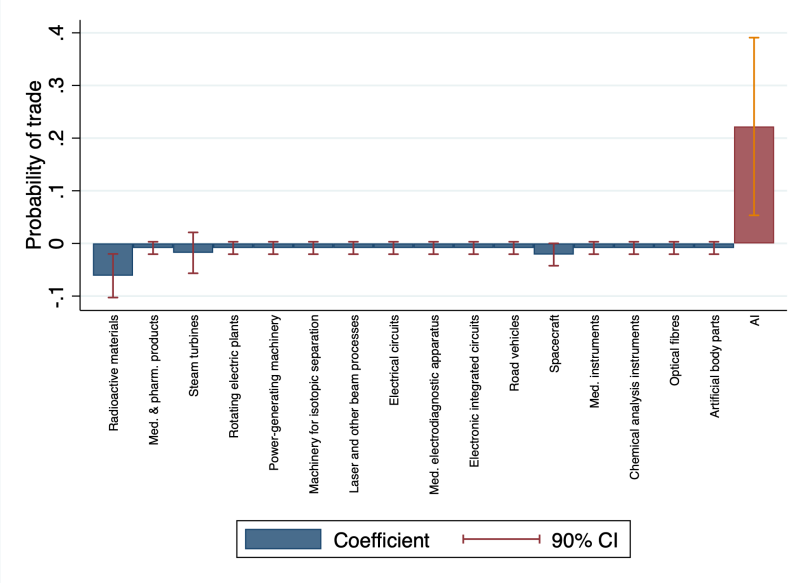
We present our findings in Table 3, Panel A. One can see in column 1 that mature democracies and autocracies import most technologies similarly (β_1 is close to zero). Mature democracies are less likely to import AI from China relative to other frontier technologies (β_2 is negative), but autocracies and weak democracies are substantially more likely to import AI from China relative to democracies (β_3 is positive). The estimated β_3 implies a 22% increase in the probability that autocra-

[18] We cluster errors by importer in this table, given that that there is only a single exporter.

cies' and weak democracies' import Chinese AI, relative to their imports of other frontier technologies from China. One can see in columns 2–4 that these results hold controlling for a variety of importing countries' geographic, economic, and political characteristics.

To benchmark this result, we repeat the analysis but now estimate the differential imports from China one frontier technology sector s at a time. We plot the β_3 coefficients for each technology in Figure 3. One observes a striking pattern: AI is the *only* frontier technology that autocracies and weak democracies are more likely to import from China.

Figure 3: Political bias in frontier technology imports from China



Note: The figure follows the specification in Table 3 and presents the coefficient and 90% confidence interval for the interaction term (Destination low Polity score X frontier technology) for each of the different frontier technologies.

Another way to benchmark the result is to compare it with technology imports from the US. The results are presented in Table 3, Panel A, columns 5-8. In contrast with the political bias in AI imports from China, we do not observe a political bias in the imports from the US (the other major AI exporter). The different patterns between imports from China and the US are statistically significant when we pool the two countries into a single regression (see Appendix Table A.10).

These patterns could stem from supply or demand side factors. On the supply

side, Chinese firms may produce particularly effective AI technology for social and political control. The Chinese government may also implicitly subsidize AI exports to autocracies and weak democracies as part of its foreign policy. Our data do not allow us to directly test for this. It is also possible that US companies self-impose bans on their AI exports. Among the 23 US companies in our dataset, 3 have released a policy banning such exports (IBM, Microsoft, and Google).[19] The first of these bans was in 2018 (Microsoft), when this issue started becoming politically salient. With this in mind, Appendix Table A.11 repeats our analysis using AI deals before 2018. We lose over half of our deals in the sample, but we find that the results for China look similar to our baseline when using the entire sample (although the magnitude of β_3 is smaller) and that, if anything, AI exports from the US were *more* biased towards mature democracies before the self-imposed bans.

Yet another supply side factor may be existing aid relationships. Countries that receive aid from China may be disproportionately more likely to also procure its surveillance AI technology, plausibly because of the compatibility with the infrastructure and other facilities that China supports. In Table 3, Panel B, we test whether recipients of aid are more likely to be importers of AI technology.[20] We do not find evidence that this is the case. Receiving aid is not associated with differential AI imports, and allowing for AI imports to depend on receipt of Chinese aid does not affect the pattern of differential AI imports across political regimes.[21]

5 When do countries import China's AI technology?

We next explore importing countries' domestic political environment as a potential demand side factor.[22] China's facial recognition AI technology may be particularly valuable to regimes that have recently experienced political unrest. The reason is that, in part, many of these AI products were demanded and developed

[19] IBM and Microsoft ban by regime type, while Google has banned all sales to governments.

[20] In Appendix Table A.13, we replicate this exercise using subcategories of aid, including official development assistance (ODA), other official flows (OOF), and direct financing. Results are similar.

[21] We also examine the role of political alignment with China using votes in the UN (following Alesina and Dollar (2000) and Qian and Yanagizawa (2009)). We do not find that political alignment accounts for the institutional bias in China's AI exports.

[22] There exist other demand side factors beyond domestic politics that we do not explore in depth. For example, we find that the absence of domestic investment in AI is associated with diferentially greater imports of surveillance AI technology from China (see Appendix Table A.14).

precisely in response to occurrence of political unrest within China (Beraja et al., 2023). This is particularly true in autocracies and weak democracies where, like in China, freedom of speech and freedom of assembly are limited and state repression is regularly deployed.

To explore this possibility, we examine how a country's yearly imports of China's facial recognition AI technology vary in response to the occurrence of domestic political unrest, as well as leads and lags of unrest.

Specifically, we estimate the following model of the imports of China's facial recognition AI technology by weak democracies and autocracies:

$$trade_{i=\text{China},s=\text{AI},jt} = \beta_0 + \sum_{h=t-2}^{t+2} \beta_{1h} unrest_{jh} + \alpha_t + \gamma_j + u_{jt}, \tag{3}$$

where h is a set of two leads of domestic unrest in importing country j, contemporaneous unrest at t when AI trade deals are observed, as well as two lags of domestic unrest. The one year lag is the omitted category. We control for calendar time fixed effects (α_t) as well as importing country fixed effects (γ_j).

Table 4 presents the results. One can see in column 1 that greater political unrest in weak democracies and autocracies in a given year is associated with a significantly higher likelihood of importing China's facial recognition AI technology in the corresponding year. There were no differential trends in AI imports prior to episodes of unrest, suggesting that the regimes do not preemptively import surveillance AI anticipating future unrest. Moreover, we find that surveillance AI imports are not statistically significantly different during one or two years after episodes of unrest.

We next explore the robustness of these patterns. One may be concerned that changes in local unrest and surveillance AI imports may reflect broad changes in the domestic country's economic conditions and trade activities. We find that our baseline results remain quantitatively similar when we control for country-specific time trend, total trade volume, and/or the importer GDP (columns 1-4). Moreover, a similar pattern is observed among countries' imports of China's smart city surveillance AI technology where the importing countries' governments are the explicit purchasers (columns 5-8). In order to visualize our estimates, we plot the β_{1h} coefficients in Figure 4, Panel A.

Table 3: Leading exporters' trade in AI by importers' Polity score

	China exports				*US exports*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: effect by regime type								
Autocracy and weak democracy	-0.004	-0.003	-0.003	0.000	-0.003	-0.002	0.002	-0.002
	(0.003)	(0.003)	(0.005)	(0.003)	(0.004)	(0.005)	(0.005)	(0.004)
AI	-0.600***	-0.597***	-0.560	-0.601***	-0.727***	-0.726***	-0.734***	-0.732***
	(0.097)	(0.101)	(0.794)	(0.096)	(0.062)	(0.062)	(0.065)	(0.060)
Autocracy and weak democracy X AI	0.222**	0.266**	0.223*	0.231**	-0.015	-0.032	0.001	-0.031
	(0.103)	(0.102)	(0.121)	(0.108)	(0.077)	(0.077)	(0.081)	(0.080)
N	2394	2394	2394	2394	2394	2394	2394	2394
Panel B: horserace regime type and aid relationship								
Autocracy and weak democracy	-0.005	-0.004	-0.004	-0.001	-0.005	-0.004	-0.001	-0.005
	(0.003)	(0.003)	(0.005)	(0.003)	(0.004)	(0.005)	(0.005)	(0.005)
AI	-0.598***	-0.580***	-0.545	-0.598***	-0.738***	-0.737***	-0.744***	-0.741***
	(0.100)	(0.102)	(0.804)	(0.099)	(0.063)	(0.063)	(0.066)	(0.061)
Autocracy and weak democracy X AI	0.218**	0.246**	0.218*	0.226**	0.007	-0.011	0.021	-0.014
	(0.106)	(0.106)	(0.122)	(0.110)	(0.079)	(0.078)	(0.083)	(0.082)
Aid from exporter to importer	0.001	0.001	0.000	0.001	0.003**	0.003**	0.003***	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
AI X aid	0.004	0.020	0.004	0.005	-0.029	-0.029	-0.029	-0.023
	(0.049)	(0.038)	(0.049)	(0.050)	(0.025)	(0.025)	(0.025)	(0.027)
N	2394	2394	2394	2394	2394	2394	2394	2394
Log importer GDP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No	No	Yes	No	No
Institutional characteristics	No	No	Yes	No	No	No	Yes	No
Geographical characteristics	No	No	No	Yes	No	No	No	Yes

Notes: Regression at the product-import country level. Outcome is dummy for trade. Omitted: destination mature democracy X not AI. All columns control for importer GDP and log distance. Panel B additionally interacts AI by the standardized amount of total aid given to the importer. Columns (2) and (6) add controls for common border and shared colonial background. Columns (3) and (7) add controls for legal system and religion. Columns (4) and (8) add controls for landlocked and island characteristics. Standard errors are clustered by export country. * significant at 10% ** significant at 5% *** significant at 1%.

Importantly, what we find for Chinese surveillance AI technology does not simply reflect a generic trend in imports of China's other frontier technologies or in imports of AI from any other country. We observe no relationship between imports and the occurrence of political unrest when we pool non-AI frontier technologies (see Appendix Table A.15). Neither do we observe any other frontier technology exhibiting the same pattern as AI technology (Figure 5). In addition, we find that it is *Chinese* facial recognition AI that is particularly demanded by countries experiencing unrest: when we examine AI imports from the US, we do not observe differential imports from countries experiencing unrest (see Appendix Table A.16).

Table 4: Local unrest on AI trade to autocracies and weak democracies

	AI import deals (all)				AI import deals (smart city)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AI 2 years before unrest	-0.025	-0.020	-0.020	-0.020	-0.008	-0.005	-0.005	-0.005
	(0.021)	(0.021)	(0.021)	(0.022)	(0.018)	(0.020)	(0.020)	(0.020)
AI same year as unrest	0.073*	0.094*	0.096**	0.097**	0.040*	0.053**	0.055**	0.056**
	(0.041)	(0.047)	(0.048)	(0.048)	(0.023)	(0.026)	(0.027)	(0.027)
AI 1 year after unrest	-0.024*	-0.016	-0.016	-0.016	-0.015	-0.010	-0.010	-0.010
	(0.013)	(0.013)	(0.013)	(0.013)	(0.010)	(0.011)	(0.011)	(0.011)
AI 2 years after unrest	0.007	0.021	0.022	0.024	0.001	0.009	0.010	0.010
	(0.013)	(0.015)	(0.015)	(0.016)	(0.009)	(0.010)	(0.010)	(0.010)
N	1226	1226	1226	1200	1226	1226	1226	1200
Country time trend	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Total trade	No	No	Yes	Yes	No	No	Yes	Yes
Log importer GDP	No	No	No	Yes	No	No	No	Yes

Notes: Regressions are at the country-year level, stacked so that the independent variable (unrest) vary within an observation. Unrest is standardized. Trade deals is a dummy for any export from China. A Polity score of 7 is used as the cutoff for a 'full democracy' by the Polity IV project (Marshall et al., 2016), which we use to distinguish mature and weak democracies. Residualized number of trade deals relative to year = 0 and controlling for AI 1 year before unrest X year. All columns have fixed effects for import country and year. Standard errors are clustered at the import country level. * significant at 10% ** significant at 5% *** significant at 1%.

One may wonder whether we observe similar efforts to enhance surveillance and political control using China's AI technology even in mature democracies. We replicate the above exercise, but now focusing on mature democracies as importing countries. The results are presented in Appendix Table A.17, and Figure 4, Panel B, plots the β_{1h} coefficients for mature democracies. We do *not* find evidence of mature democracies' importing China's AI technology in response to domestic political unrest. This suggests that governments' motives for importing and de-

ploying China's surveillance AI technology differ across institutional types. Autocracies and weak democracies — which may benefit from a stronger surveillance capacity — import surveillance AI technology precisely when the demand for state repression is high. Mature democracies, on the other hand, do not appear to differentially import surveillance technology at such times.

6 Technology of political control and the entrenchment of non-democratic regimes

We next explore whether the import of surveillance AI technology occurs alongside other measures associated with political control and repression, and the entrenchment of non-democratic regimes.

Erosion of electoral institutional quality. We begin by examining whether imports of surveillance AI technology in a context of domestic unrest are concomitant with broad changes in domestic institutional quality. Specifically, we estimate a long-difference (cross-sectional) model in which changes in political institutional quality in importing country i are predicted by the total amount of surveillance AI technology imports from China specifically in years with above median levels of domestic political unrest. We measure domestic institutional quality, particularly those related to the functioning of free and fair elections, using the overall NELDA index, as described in Section 2. A country's change in institutional quality is measured as the difference between the average level at the end of the sampling period (2019-2021) and the beginning (2005-2007).[23] The model is as follows:

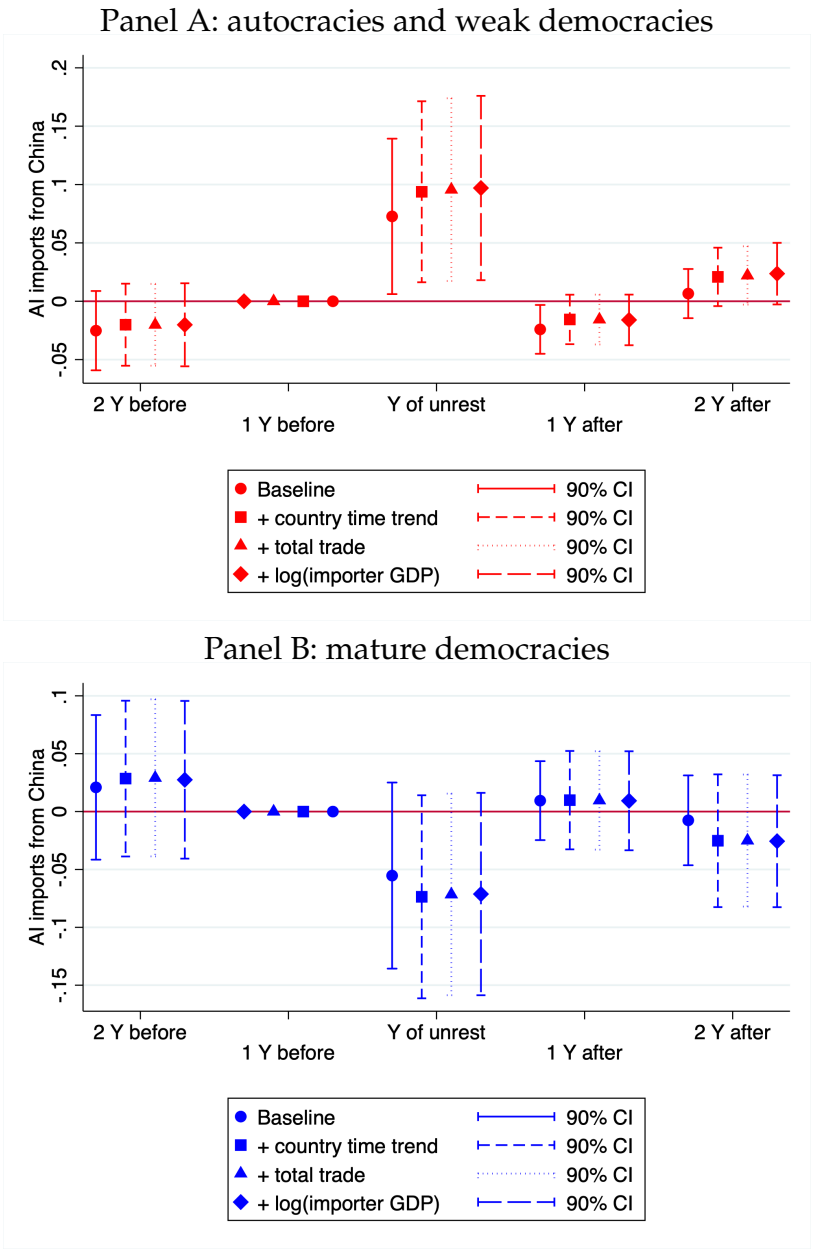
$$\Delta Institution_j = \beta_0 + \beta_1 \sum_t trade_{i=\text{China},s=\text{AI},jt} \mathbb{I}_{unrest_{jt} > \text{median}_j} + u_j, \tag{4}$$

where $\sum_t trade_{i=\text{China},s=\text{AI},jt} \mathbb{I}_{unrest_{jt} > \text{median}_j}$ indicates the sum total of surveillance AI imports from China by country j during years t with above-median domestic unrest.

Table 5, Panel A, presents the estimated relationships among importing countries that are weak democracies and autocracies. Surveillance AI imports from

[23] We study the average institutional quality measures over three years to account for the differential timing of elections across countries.

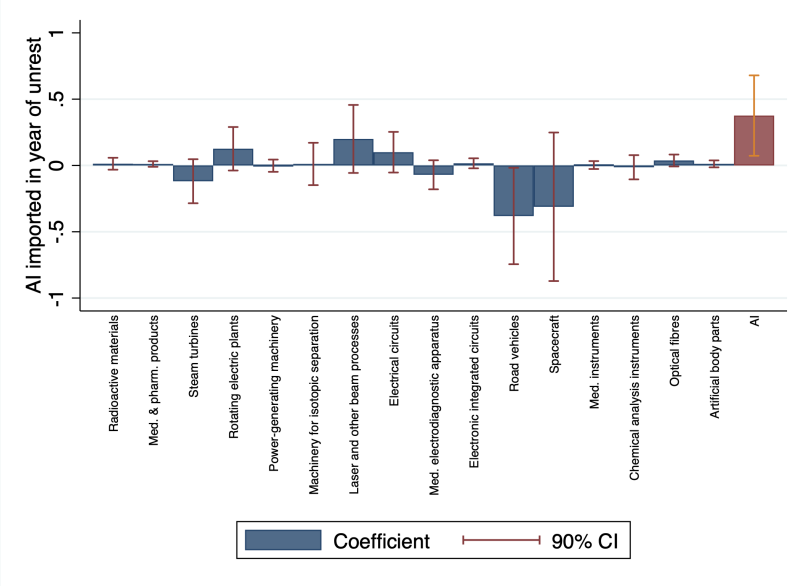
Figure 4: Local unrest on AI trade



Note: This figure follows the specification in Tables 4 (Panel A) and A.17 (Panel B), Columns 1-4, and presents the coefficients and 90% confidence intervals for trade in AI to weak democracies and autocracies (in red) and strong democracies (in blue).

China during episodes of domestic unrest are associated with a broad decline in institutional quality. This is true in a specification without any controls (column 1), and the negative relationship remains when we control for total AI imports

Figure 5: Local unrest on AI and frontier trade to autocracies and weak democracies



Note: This figure follows the specification in Table 4 and presents the coefficient and 90% confidence interval for trade links in a given frontier technology s in the same year as unrest for each of the different frontier technologies.

throughout the period, total domestic unrest episodes, and total trade (columns 2-5). Rather than reflecting a causal effect of surveillance AI imports on domestic institutional quality, these findings suggest that surveillance AI imports from China and the erosion of domestic institutions may be joint outcomes of regimes' move towards greater political control.

We next explore the robustness of the baseline results using several alternative specifications. First, in Appendix Table A.18, we consider as outcomes each of the disaggregated NELDA indices, and we find qualitatively similar results. Second, in Appendix Table A.19, we focus instead on the smart city AI imports from China following episodes of domestic unrest, and we find similar (though quantitatively smaller) results. Third, we estimate a panel specification where we examine the relationship between AI imports from China in years with above median levels of domestic political unrest and the change in institutional quality during the subsequent two years. This specification, presented in Appendix Table A.20, again shows a negative association between the imports of surveillance AI from China and broad institutional erosion among autocracies and weak democracies.

Table 5: Local unrest and AI imports on electoral outcomes

	Political institutional quality				
	(1)	(2)	(3)	(4)	(5)
Panel A: imports by autocracies and weak democracies					
AI imports during high unrest	-0.556***	-0.688***	-0.687***	-0.704***	-0.526**
	(0.209)	(0.224)	(0.217)	(0.210)	(0.209)
N	46	46	46	46	46
Panel B: imports by mature democracies					
AI imports during high unrest	0.091***	-0.094	-0.157	0.060	0.289
	(0.026)	(0.097)	(0.240)	(0.196)	(0.255)
N	45	45	45	45	45
Panel C: exports by the US to autocracies and weak democracies					
AI imports during high unrest	-0.671*	-0.675	-0.676	-0.680	-0.540
	(0.360)	(0.519)	(0.580)	(0.576)	(0.335)
N	46	46	46	46	46
Total AI	No	Yes	Yes	Yes	Yes
Total unrest	No	No	Yes	Yes	Yes
Total trade	No	No	No	Yes	Yes
Log importer GDP	No	No	No	No	Yes

Notes: Regressions are at the country level. AI imports during high unrest is the standardized number of AI imports from China when unrest is over one standard deviation above the mean. Outcomes are the change in an inverse covariance weighted index of electoral outcomes from NELDA between the period before AI exports begin (2005-2007) and the last years for which NELDA data are available (2018-2020), where positive changes reflect improving institutional quality. The specific variables that enter the index are described in footnote A.1. Total AI is the total number of AI exports from China. A Polity score of 7 is used as the cutoff for a 'full democracy' by the Polity IV project (Marshall et al., 2016), which we use to distinguish mature and weak democracies. Standard errors are robust. * significant at 10% ** significant at 5% *** significant at 1%.

The context of technology imports matters. We then examine the relationship between surveillance AI imports and domestic institutional quality in two other contexts. We begin by estimating specifications analogous to Table 5, Panel A, but instead focusing on mature democracies as importers (results are presented in Panel B). One does *not* observe erosion in domestic institutional quality when China's AI technology is imported by mature democracies, indicating that the same technology may have context-specific effects. In particular, China's surveillance AI technology may reinforce the initial differences in domestic institutions between mature democracies *vis-a-vis* autocracies and weak democracies.

We then focus on autocracies and weak democracies' imports of surveillance

AI technology from the US in order to examine whether its surveillance AI technology is also purchased by these regimes as their institutional quality declines. We again estimate specifications analogous to Table 5, Panel A. The results are presented in Panel C. One indeed observes a decline (albeit noisier) in domestic institutional quality when autocracies and weak democracies import AI technology from the US following political unrest, suggesting that (geo-)political and technological constraints do not preclude imports in such contexts. Taken together, our results suggest that while technology can serve different purposes, regimes that seek to strengthen political control can import surveillance AI technology from different exporting countries, though doing so predominantly from China (as shown in Section 5).

Imports of arms. To the extent that surveillance AI imports reflect weak democracies and autocracies seeking to enhance their political control, one may expect changes in other key purchases of potentially repressive technologies. Specifically, we investigate arms imports from China in the context of domestic political unrest. In Appendix Figure A.5, we replicate Figure 4, using imports of Chinese arms instead of Chinese AI. We observe a similar pattern between trade in arms and AI, suggesting that imports of surveillance technology and the erosion of political institutions are part of a concerted effort to enhance the power of coercive regimes.

One may wonder if the increased imports of arms and surveillance AI from China during political unrest are simply a result of greater Chinese attention due to investments made in particular countries. We thus explore whether the broad Chinese foreign investment patterns (of infrastructure and construction projects, in particular) coincide with imports of technology facilitating political control. In Appendix Figure A.6, we replicate Figure 4, using Chinese investment in infrastructure and construction instead of Chinese AI imports.[24] We do *not* find changes in Chinese foreign investment associated with destination countries' political unrest. Imports of repressive technologies like surveillance AI and arms appear to follow a pattern distinct from broad patterns of China's oversea economic activi-

[24]The investment data used in Appendix Figure A.6 is distinct from the aid data used in Table 3. According to each source, the former is "the only comprehensive public data set covering China's global investment and construction", while the latter dataset "is unique in that it captures the full range of projects that align with the OECD's definitions of Official Development Assistance (ODA) and Other Official Flows (OOF)." Table 3 is robust to controlling for investment and construction.

ties.

The entrenchment of non-democracy. As the surveillance AI and other technologies for political control are deployed by autocracies and weak democracies during domestic political unrest, political stability may be enhanced and non-democratic institutions may be entrenched. In Appendix Figure A.7, we plot the probability that an autocracy or weak democracy experiences a regime change to become a consolidated democracy, based on whether they have received an above or below median level of AI imports from China during periods of high unrest. For countries importing an above median amount of AI during periods of high unrest, the probability of a regime change to consolidated democracy is 4.7% (1 in 21), while for countries importing a below median amount of AI, the probability of such a change is 21.7% (5 in 23). Though based on a small sample, these results suggest that a broad set of tactics adopted by autocracies during times of unrest — imports of surveillance AI, the erosion of electoral institutions, and imports of military technology — may indeed entrench non-democratic regimes.

7 Conclusion

In this paper, we show that China has a comparative advantage in facial recognition AI, and that autocracies and weak democracies are more likely to import this technology from China, especially those experiencing political unrest. This suggests the possibility that China's exports of a technology used for state surveillance may strengthen autocrats (and would-be autocrats) around the globe.

Since World War II, global economic integration has been considered instrumental to a liberal democratic world order.[25] This belief may have arisen from several factors: leading innovators have been mature democracies, leading exporters of frontier technology have been mature democracies, and frontier technologies

[25]President Bill Clinton, in a speech given in 2000 arguing for China's joining the WTO, stated, "Membership in the WTO, of course, will not create a free society in China overnight . . . But over time, I believe it will move China faster and further in the right direction, and certainly will do that more than rejection would." Source: `https://nyti.ms/3peSuXP`. Bombardini et al. (2023) explore policymakers' expectations regarding the economic impact of China's integration into the world economy, accounting for ideological concerns such as the impact of normalizing trade relations on human rights.

have not been particularly conducive to supporting autocratic regimes. These factors may no longer be true in some contexts in the 21st century, as exemplified in the case of China and its facial recognition AI technology. To the extent that trade integration could facilitate the trade of technologies of different political nature, it could challenge the long-held expectation that trade integration fosters democratization around the world and strengthens liberal regimes. Our results suggest that the effects of trade integration could be ambiguous, depending on who has the comparative advantage to produce frontier technology and to export to other countries, and who (and under what circumstances) is importing such technology.

The possibility of negative global externalities (i.e., lost civil liberties and political rights) arising from trade in AI should inform policy discussions on international standards for AI development and trade. Regulation of trade in facial recognition AI can be modeled on existing regulations on trade in products with global externalities. Products sharing similar features include dual-use (military-civilian) technologies, which can contribute to global conflict; goods produced using inputs that are unethically sourced, such as child labor; or, goods that generate negative production or consumption externalities, such as pollution. Autocratically biased AI technology can involve externalities that are both upstream (e.g., data collected for the purpose of domestic political repression) and downstream (e.g., technology used for political repression in importing countries). These features suggest that trade regulations need to be carefully devised in order to achieve the desired goal, and to ensure countries' ability to credibly commit to enforcing such regulations.

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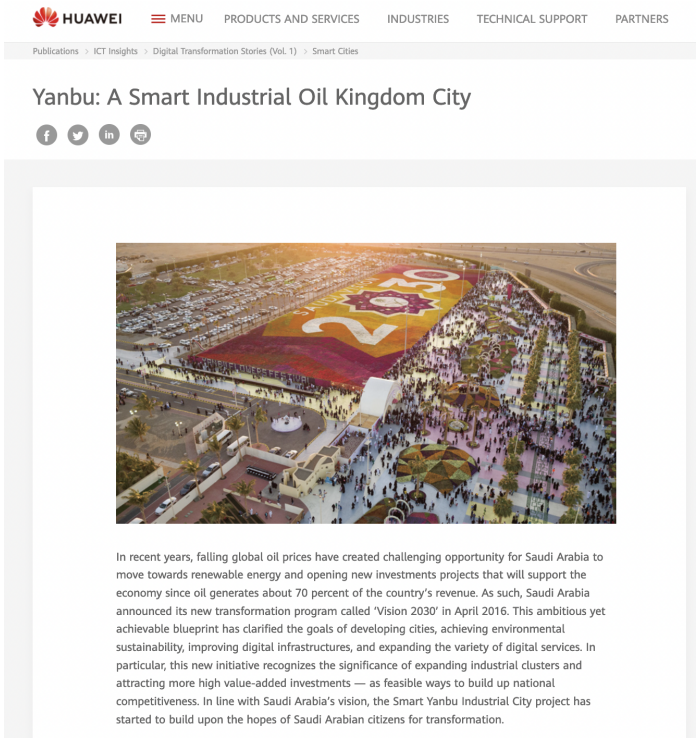
Online Appendix for:
Exporting the Surveillance State via Trade in AI

This appendix contains additional figures and tables for the article "Exporting the Surveillance State via Trade in AI."

Figure A.1: AI export case studies

Panel A: from China to Saudi Arabia



Panel B: from the United States to Kuwait

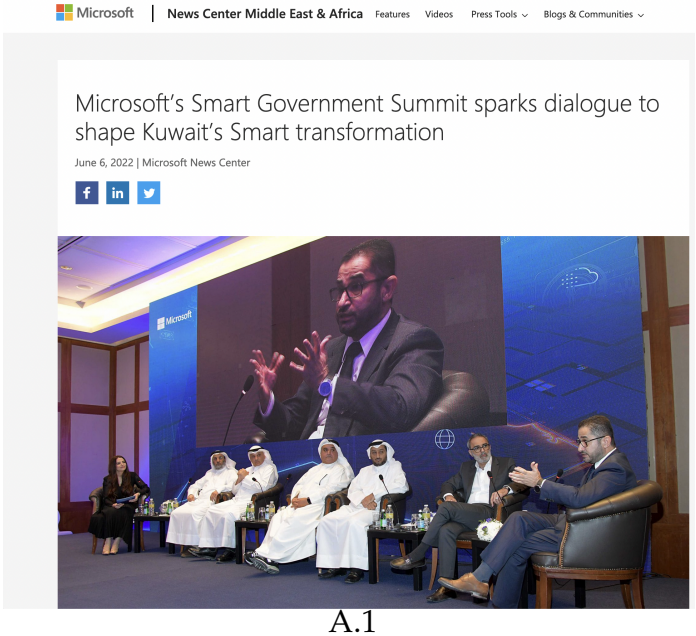
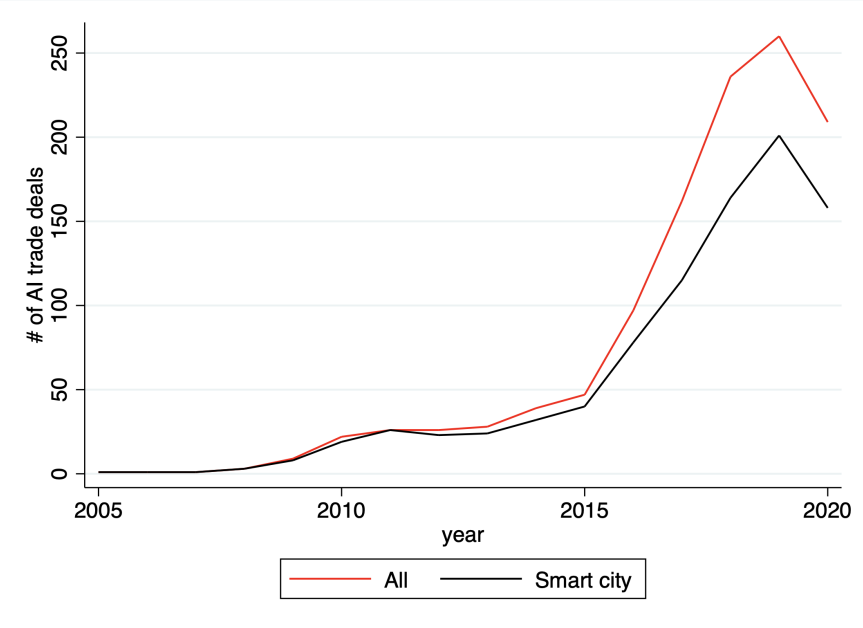
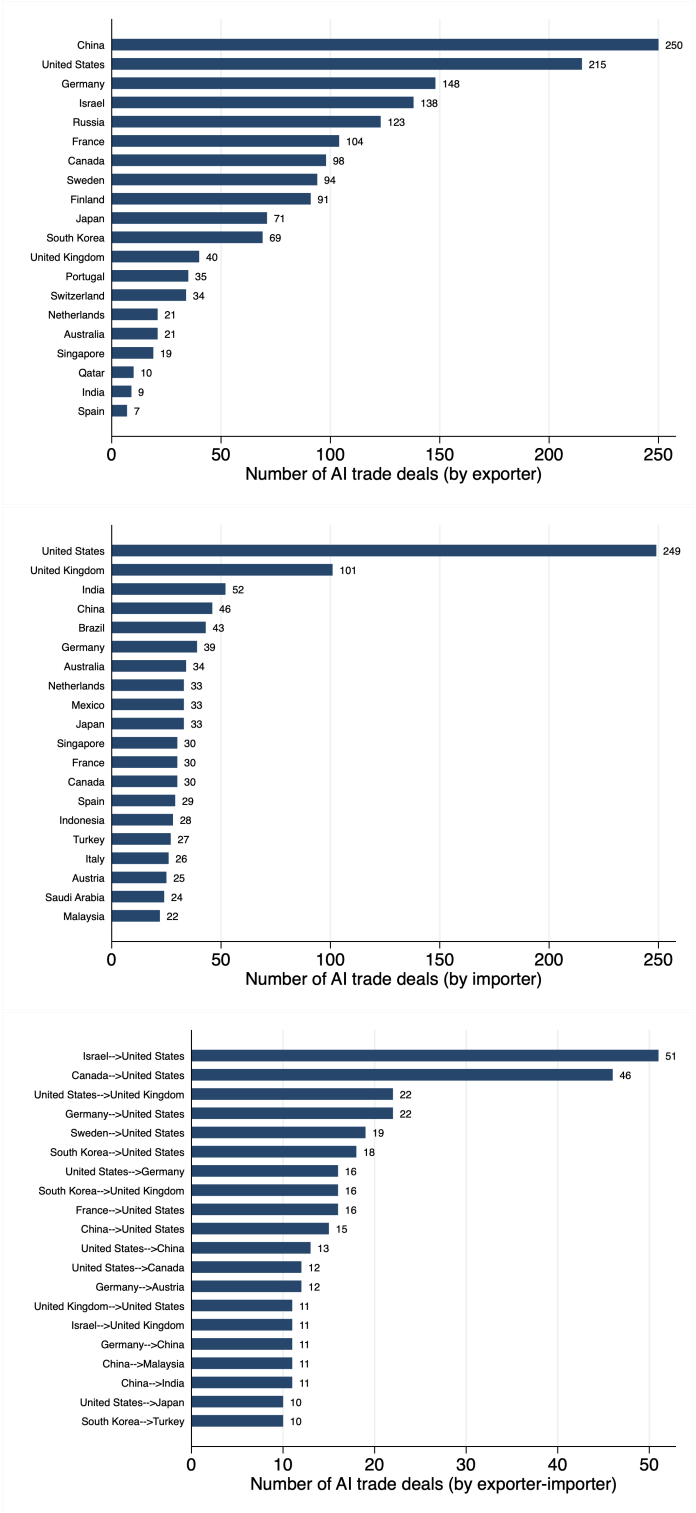


Figure A.2: Trade in surveillance AI over time



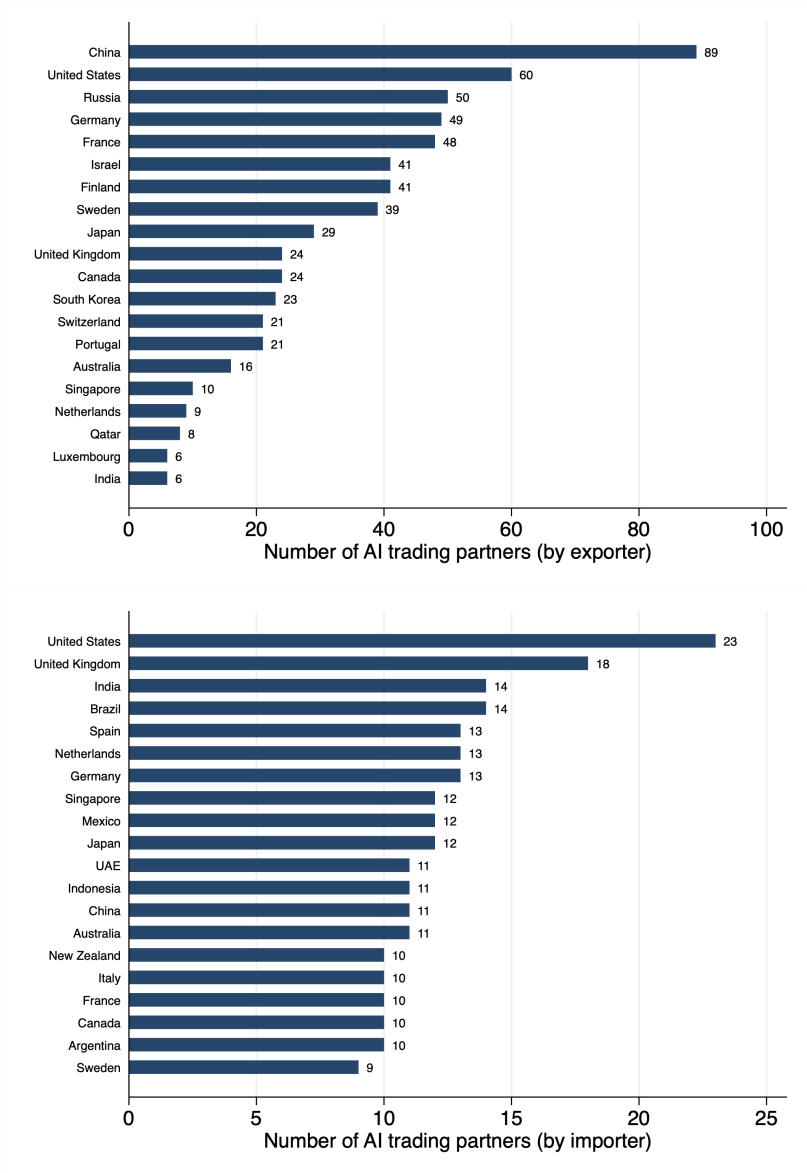
Note: Number of facial recognition AI trade deals by year.

Figure A.3: Top surveillance AI importers and exporters (by # of trade deals)



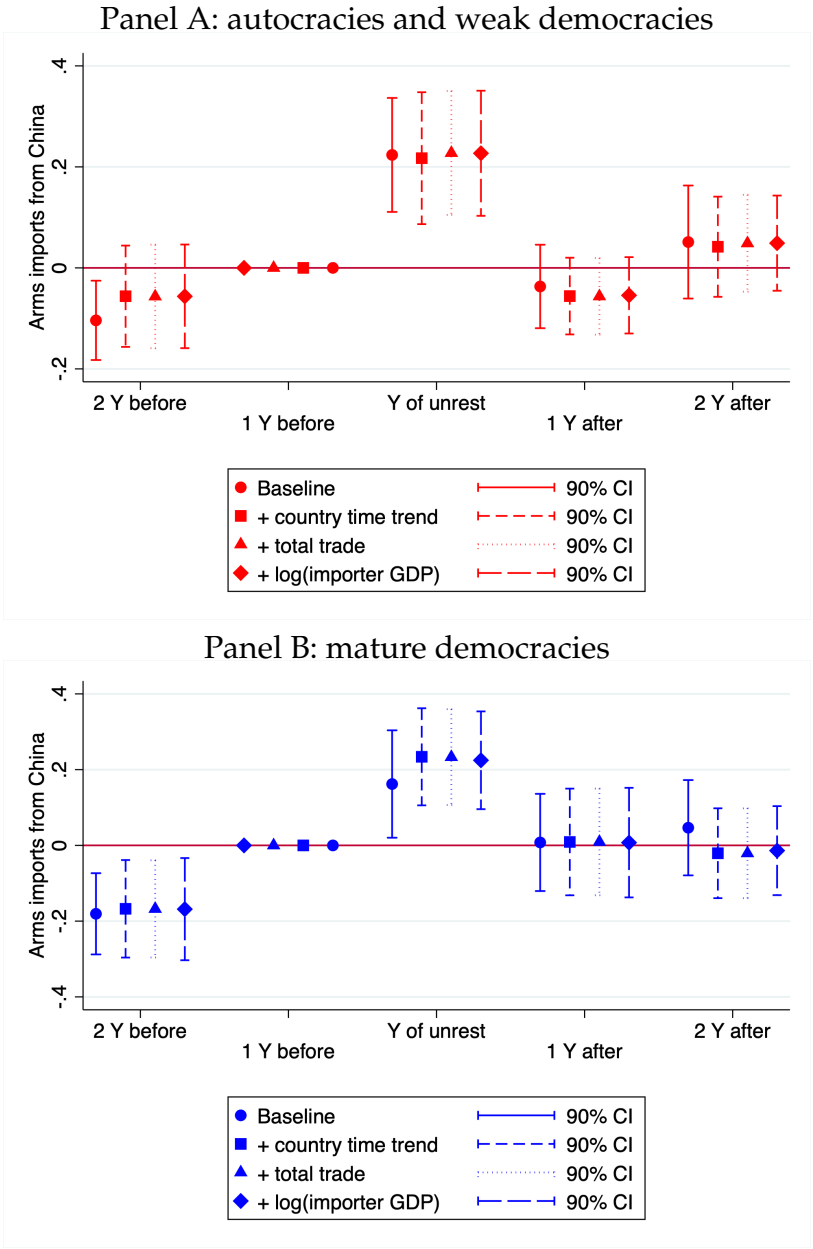
Note: Number of facial recognition AI trade deals by exporter (top), importer (middle), and exporter-importer pairs (bottom).

Figure A.4: Top surveillance AI importers and exporters (by # of trade partners)



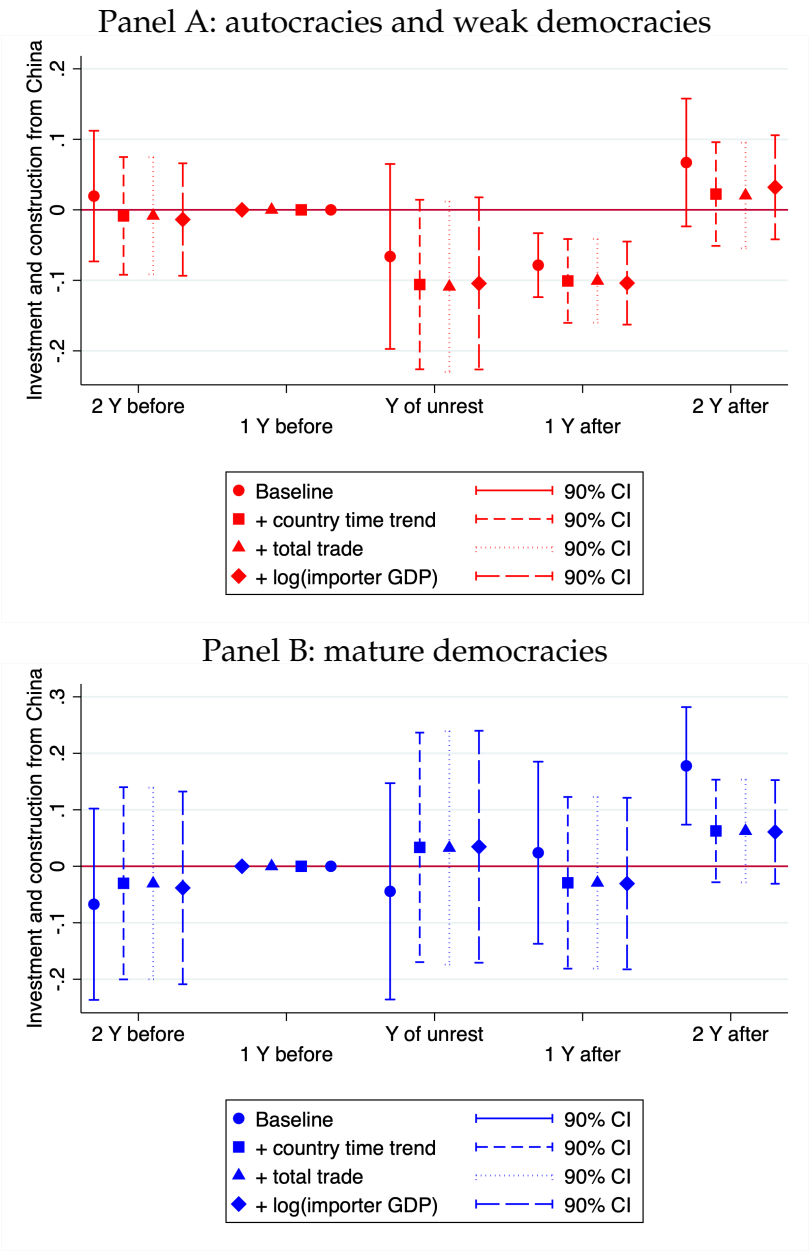
Note: Number of facial recognition AI trading partners by exporter (top) and importer (bottom).

Figure A.5: Local unrest on Chinese arms



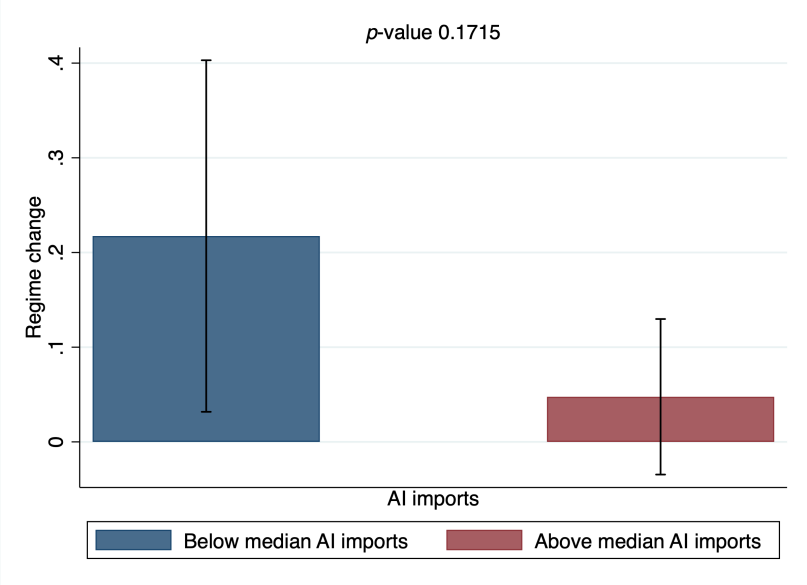
Note: This figure follows the specification in Tables 4 (Panel A) and A.17 (Panel B), Columns 1-4, using Chinese arms imports of AI imports as the outcome, and presents the coefficients and 90% confidence intervals for trade in AI to weak democracies and autocracies (in red) and strong democracies (in blue).

Figure A.6: Local unrest on Chinese investment and construction



Note: This figure follows the specification in Tables 4 (Panel A) and A.17 (Panel B), Columns 1-4, using Chinese investment and construction instead of AI imports as the outcome, and presents the coefficients and 90% confidence intervals for trade in AI to weak democracies and autocracies (in red) and strong democracies (in blue).

Figure A.7: AI imports during high unrest on regime change



Note: This figure plots the probability of regime change among autocracies and weak democracies, split by whether they received above or below median levels of AI imports from China during periods of high (above median) unrest.

Table A.1: NELDA variables used to construct institutional quality measures

NELDA #	Question text	In overall index	Sub-index
(1)	(2)	(3)	(4)
1*	Were regular elections suspended before this election?	Yes	1. Fair elections
3	Was opposition allowed?	Yes	1. Fair elections
4	Was more than one party legal?	Yes	1. Fair elections
5	Was there a choice of candidates on the ballot?	Yes	1. Fair elections
6*	If regular, were these elections early or late relative to the date they were supposed to be held per established procedure?	Yes	1. Fair elections
7	Before elections, were there clear indications that the incumbent had made a prior decision to give up power?	Yes	1. Fair elections
9*	Had the incumbent extended his or her term in office or eligibility to run in elections at any point in the past?	Yes	1. Fair elections
11*	Before elections, are there significant concerns that elections will not be free and fair?	Yes	1. Fair elections
13*	Were opposition leaders prevented from running?	Yes	1. Fair elections
14*	Did some opposition leaders boycott the election?	Yes	1. Fair elections
15*	Is there evidence that the government harassed the opposition?	Yes	1. Fair elections
16*	In the run-up to the election, were there allegations of media bias in favor of the incumbent?	Yes	2. Media bias
28*	Is there evidence that reports critical of the government's handling of the election reached large numbers of people?	Yes	2. Media bias
29*	Were there riots and protests after the election?	Yes	3. Peaceful elections
30*	If yes (NELDA-29): did they involve allegations of vote fraud?	Yes	3. Peaceful elections
31*	If yes (NELDA-29): did the government use violence against demonstrators?	Yes	3. Peaceful elections
32*	Were results that did not favor the incumbent canceled?	Yes	1. Fair elections
33*	Was there significant violence involving civilian deaths immediately before, during, or after the election?	Yes	3. Peaceful elections
34*	Were results that were favorable to the incumbent canceled?	Yes	1. Fair elections
35*	If yes (NELDA-34): was this in part a result of wide-spread protests?	Yes	3. Peaceful elections
36*	If yes (NELDA-34): was this in part a result of outside pressure?	Yes	3. Peaceful elections
45	Were international monitors present?	Yes	4. Election monitors
46	If yes (NELDA-45), were Western monitors present?	Yes	4. Election monitors
47*	If yes (NELDA-46), were there allegations by Western monitors of significant vote-fraud?	Yes	4. Election monitors
48*	Were some monitors denied the opportunity to be present by the government holding elections?	Yes	4. Election monitors
49*	Did any monitors refuse to go to an election because they believed that it would not be free and fair?	Yes	4. Election monitors
57*	Is aid cut-off, or threatened to be cut-off, by an outside actor at any point before or after the election?	Yes	4. Election monitors

Notes: This table presents which National Elections Across Democracy and Autocracy Dataset 6.0 (NELDA) questions are included in the measure of institutional quality. Variables are indicators for the answer being "Yes", except for questions marked with a $*$, which are coded as indicators for an answer "No" (because they reflect worse institutional quality). We exclude some questions as they are not directly relevant to institutional quality. For instance, NELDA-17, 'Is economic growth in the country said to be good?', NELDA-21 'Did the incumbent run?', or NELDA-50, 'Is country said to be in good relations with the US before the elections?'

Table A.2: China vs. rest of world, AI vs. frontier technologies — Carnegie sample

	Engage in trade			
	(1)	(2)	(3)	(4)
Origin China	-0.026	-0.026	-0.012	-0.026
	(0.024)	(0.024)	(0.025)	(0.024)
AI	-0.354***	-0.355***	-0.353***	-0.352***
	(0.010)	(0.010)	(0.010)	(0.010)
Origin China X AI	0.444***	0.443***	0.427***	0.444***
	(0.033)	(0.033)	(0.033)	(0.033)
N	402300	402300	402300	402300
Log importer/exporter GDP	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No
Institutional characteristics	No	No	Yes	No
Geographical characteristics	No	No	No	Yes

Notes: Regressions are at the product-import-export country dyad level. Outcome is dummy for trade. Omitted: not China X not AI. This table only uses trade deals identified in Feldstein (2019). All columns control for importer/exporter GDP and log distance. Column (2) adds controls for common border, free trade agreements, and shared colonial background. Column (3) adds controls for common language, legal system, and religion. Column (4) adds controls for landlocked and island characteristics. Standard errors are clustered by origin country. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.3: Leading exporters' trade in AI by importers' Polity score — Carnegie sample

	China exports				*US exports*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Autocracy and weak democracy	-0.004	-0.003	-0.002	-0.001	-0.003	-0.002	0.002	-0.003
	(0.003)	(0.003)	(0.005)	(0.003)	(0.005)	(0.005)	(0.006)	(0.005)
AI	-0.352***	-0.371***	0.096	-0.351***	-0.229***	-0.227***	-0.221**	-0.218**
	(0.083)	(0.094)	(0.750)	(0.082)	(0.087)	(0.086)	(0.092)	(0.087)
Autocracy and weak democracy X AI	0.166*	0.186*	0.118	0.153	-0.198*	-0.211*	-0.213*	-0.188*
	(0.099)	(0.106)	(0.109)	(0.103)	(0.105)	(0.108)	(0.110)	(0.109)
N	2261	2261	2261	2261	2261	2261	2261	2261
Log importer GDP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No	No	Yes	No	No
Institutional characteristics	No	No	Yes	No	No	No	Yes	No
Geographical characteristics	No	No	No	Yes	No	No	No	Yes

Notes: Regression at the product-import country level. Outcome is dummy for trade. Omitted: destination democracy with Polity score over 7 X not AI. This table only uses trade deals identified in Feldstein (2019). All columns control for importer GDP and log distance. Columns (2) and (6) add controls for common border and shared colonial background. Columns (3) and (7) add controls for legal system and religion. Columns (4) and (8) add controls for landlocked and island characteristics. Standard errors are clustered by export country. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.4: Local unrest on AI and frontier trade to autocracies and weak democracies — Carnegie sample

	AI import deals (all)				AI import deals (smart city)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AI 2 years before unrest	-0.026	-0.022	-0.022	-0.022	-0.008	-0.007	-0.007	-0.006
	(0.021)	(0.022)	(0.021)	(0.022)	(0.018)	(0.020)	(0.020)	(0.020)
AI same year as unrest	0.074*	0.093*	0.094*	0.095*	0.041*	0.051*	0.053*	0.054*
	(0.040)	(0.047)	(0.047)	(0.048)	(0.023)	(0.026)	(0.027)	(0.027)
AI 1 year after unrest	-0.023*	-0.015	-0.015	-0.015	-0.014	-0.009	-0.009	-0.009
	(0.013)	(0.013)	(0.013)	(0.013)	(0.010)	(0.011)	(0.011)	(0.011)
AI 2 years after unrest	0.006	0.020	0.020	0.021	0.001	0.007	0.008	0.008
	(0.013)	(0.016)	(0.015)	(0.016)	(0.008)	(0.010)	(0.010)	(0.010)
N	1226	1200	1226	1200	1226	1226	1226	1200
Country time trend	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Total trade	No	No	Yes	Yes	No	No	Yes	Yes
Log importer GDP	No	No	No	Yes	No	No	No	Yes

Notes: Regressions are at the country-year level, stacked so that the independent variable (unrest) vary within an observation. Unrest is standardized. Trade deals are only the exports from China identified in Feldstein (2019). A Polity score of 7 is used as the cutoff for a 'full democracy' by the Polity IV project (Marshall et al., 2016), which we use to distinguish mature and weak democracies. Residualized number of trade deals relative to year = 0 and controlling for AI 2 years before unrest X year. All columns have fixed effects for import country and year. Standard errors are clustered at the import country level. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.5: China vs. rest of world, AI vs. frontier technologies (standardized outcome)

	Standardized trade			
	(1)	(2)	(3)	(4)
Origin China	0.384***	0.383***	0.411***	0.383***
	(0.078)	(0.077)	(0.080)	(0.076)
AI	-0.671***	-0.673***	-0.669***	-0.663***
	(0.027)	(0.026)	(0.027)	(0.026)
Origin China X AI	1.103***	1.104***	1.077***	1.103***
	(0.079)	(0.078)	(0.081)	(0.079)
N	402300	402300	402300	402300
Log importer/exporter GDP	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No
Institutional characteristics	No	No	Yes	No
Geographical characteristics	No	No	No	Yes

Notes: Regressions are at the product-import-export country dyad level. Outcome is the log(trade+1), standardized. Omitted: not China X not AI. All columns control for importer/exporter GDP and log distance. Column (2) adds controls for common border, free trade agreements, and shared colonial background. Column (3) adds controls for common language, legal system, and religion. Column (4) adds controls for landlocked and island characteristics. Standard errors are clustered by origin country. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.6: Leading exporters' trade in AI by importers' Polity score (standardized outcome)

	China exports				*US exports*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Autocracy and weak democracy	0.028	0.042*	0.049	0.030	-0.098**	-0.102**	-0.078**	-0.105*
	(0.025)	(0.024)	(0.031)	(0.025)	(0.044)	(0.048)	(0.037)	(0.059)
AI	-1.696***	-1.732***	0.338	-1.701***	-2.391***	-2.390***	-2.395***	-2.407***
	(0.326)	(0.340)	(2.721)	(0.325)	(0.191)	(0.191)	(0.193)	(0.185)
Autocracy and weak democracy X AI	0.805**	0.963***	0.732*	0.801**	0.148	0.143	0.171	0.094
	(0.343)	(0.338)	(0.398)	(0.358)	(0.237)	(0.240)	(0.242)	(0.246)
N	2394	2394	2394	2394	2394	2394	2394	2394
Log importer GDP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No	No	Yes	No	No
Institutional characteristics	No	No	Yes	No	No	No	Yes	No
Geographical characteristics	No	No	No	Yes	No	No	No	Yes

Notes: Regression at the product-import country level. Outcome is the log(trade+1), standardized. Omitted: destination democracy with Polity score over 7 X not AI. All columns control for importer GDP and log distance. Columns (2) and (6) add controls for common border and shared colonial background. Columns (3) and (7) add controls for legal system and religion. Columns (4) and (8) add controls for landlocked and island characteristics. Standard errors are clustered by export country. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.7: Local unrest on AI and frontier trade to autocracies and weak democracies (standardized outcome)

	AI import deals (all)				AI import deals (smart city)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AI 2 years before unrest	-0.101	-0.081	-0.017	-0.017	-0.044	-0.028	0.042	0.043
	(0.081)	(0.085)	(0.063)	(0.063)	(0.106)	(0.118)	(0.112)	(0.112)
AI same year as unrest	0.290*	0.368**	0.224**	0.231**	0.233*	0.310**	0.208**	0.187**
	(0.158)	(0.183)	(0.086)	(0.088)	(0.135)	(0.154)	(0.080)	(0.077)
AI 1 year after unrest	-0.092*	-0.059	-0.059	-0.058	-0.088	-0.060	-0.058	-0.062
	(0.050)	(0.051)	(0.055)	(0.055)	(0.059)	(0.063)	(0.072)	(0.075)
AI 2 years after unrest	0.026	0.083	0.039	0.042	0.008	0.050	0.031	0.019
	(0.050)	(0.059)	(0.036)	(0.043)	(0.050)	(0.058)	(0.052)	(0.059)
N	1226	1226	876	872	1226	1226	876	872
Country time trend	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Total trade	No	No	Yes	Yes	No	No	Yes	Yes
Log importer GDP	No	No	No	Yes	No	No	No	Yes

Notes: Regressions are at the country-year level, stacked so that the independent variable (unrest) vary within an observation. Unrest is standardized. Trade deals are exports from China. A Polity score of 7 is used as the cutoff for a 'full democracy' by the Polity IV project (Marshall et al., 2016), which we use to distinguish mature and weak democracies. Residualized number of trade deals relative to year = 0 and controlling for AI 1 year before unrest X year. All columns have fixed effects for import country and year. Standard errors are clustered at the import country level. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.8: China vs. rest of world, smart city AI vs. frontier technologies

	Engage in trade			
	(1)	(2)	(3)	(4)
Origin China	-0.026	-0.026	-0.012	-0.026
	(0.024)	(0.024)	(0.025)	(0.024)
AI	-0.357***	-0.358***	-0.356***	-0.355***
	(0.010)	(0.010)	(0.010)	(0.010)
Origin China X AI	0.383***	0.381***	0.368***	0.383***
	(0.029)	(0.029)	(0.029)	(0.029)
N	402300	402300	402300	402300
Log importer/exporter GDP	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No
Institutional characteristics	No	No	Yes	No
Geographical characteristics	No	No	No	Yes

Notes: Regressions are at the product-import-export country dyad level. Outcome is dummy for trade. Omitted: not China X not smart city AI. All columns control for import/export GDP and log distance. Column (2) adds controls for common border, free trade agreements, and shared colonial background. Column (3) adds controls for common language, legal system, and religion. Column (4) adds controls for landlocked and island characteristics. Standard errors are clustered by origin country. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.9: US vs. China, AI vs. frontier technologies

	Engage in trade			
	(1)	(2)	(3)	(4)
Origin China	-0.005	-0.005	0.005	-0.005
	(0.004)	(0.004)	(0.007)	(0.004)
AI	-3.361***	-3.331***	-3.514***	-3.333***
	(0.253)	(0.242)	(0.277)	(0.275)
Origin China X AI	0.172***	0.179***	0.241***	0.172***
	(0.043)	(0.042)	(0.060)	(0.043)
N	5364	5364	5364	5364
Log importer/exporter GDP	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No
Institutional characteristics	No	No	Yes	No
Geographical characteristics	No	No	No	Yes

Notes: Regressions are at the product-import-export country dyad level. Outcome is dummy for trade. Omitted: US X not AI. All columns control for import/export GDP and log distance. Column (2) adds controls for common border, free trade agreements, and shared colonial background. Column (3) adds controls for common language, legal system, and religion. Column (4) adds controls for landlocked and island characteristics. Standard errors are clustered by origin country. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.10: Leading exporters' trade in AI by importers' Polity score — pooled regression

	Linear probability of trade			
	(1)	(2)	(3)	(4)
Autocracy and weak democracy	-0.007*	-0.007*	-0.002	-0.006
	(0.004)	(0.004)	(0.005)	(0.004)
Origin China	-0.000	-0.000	0.011*	-0.000
	(0.001)	(0.001)	(0.006)	(0.001)
AI	-0.669***	-0.671***	-0.685***	-0.661***
	(0.061)	(0.061)	(0.073)	(0.061)
Autocracy and weak democracy X AI	-0.022	-0.013	-0.035	-0.016
	(0.072)	(0.074)	(0.078)	(0.075)
Origin China X AI	-0.027	-0.024	0.013	-0.026
	(0.081)	(0.079)	(0.099)	(0.081)
Autocracy and weak democracy X origin China	0.006	0.006	0.002	0.006
	(0.005)	(0.005)	(0.006)	(0.005)
Autocracy and weak democracy X origin China X AI	0.324***	0.333***	0.343***	0.323***
	(0.103)	(0.100)	(0.105)	(0.103)
N	4788	4788	4788	4788
Log importer/exporter GDP	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No
Institutional characteristics	No	No	Yes	No
Geographical characteristics	No	No	No	Yes

Notes: Regression at the product-import-export country dyad level. Outcome is dummy for trade. Omitted: origin US X mature democracy X not AI. All columns control for import/export GDP and log distance. Column (2) adds controls for common border, free trade agreements, and shared colonial background. Column (3) adds controls for common language, legal system, and religion. Column (4) adds controls for landlocked and island characteristics. Standard errors are clustered by destination country. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.11: Leading exporters' trade in AI by importers' Polity score, before 2017

	China exports				*US exports*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Autocracy and weak democracy	-0.004	-0.003	-0.002	-0.001	-0.003	-0.002	0.002	-0.003
	(0.003)	(0.003)	(0.005)	(0.003)	(0.005)	(0.005)	(0.006)	(0.005)
AI	-0.352***	-0.371***	0.096	-0.351***	-0.216**	-0.214**	-0.199**	-0.202**
	(0.083)	(0.094)	(0.750)	(0.082)	(0.088)	(0.087)	(0.090)	(0.085)
Autocracy and weak democracy X AI	0.166*	0.186*	0.118	0.153	-0.230**	-0.246**	-0.245**	-0.218**
	(0.099)	(0.106)	(0.109)	(0.103)	(0.104)	(0.108)	(0.108)	(0.109)
N	2261	2261	2261	2261	2261	2261	2261	2261
Log importer GDP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No	No	Yes	No	No
Institutional characteristics	No	No	Yes	No	No	No	Yes	No
Geographical characteristics	No	No	No	Yes	No	No	No	Yes

Notes: Regression at the product-import country level. Outcome is dummy for trade. Omitted: destination mature democracy X not AI. All trade deals are from the year 2017 or earlier. All columns control for importer GDP and log distance. Columns (2) and (6) add controls for common border and shared colonial background. Columns (3) and (7) add controls for legal system and religion. Columns (4) and (8) add controls for landlocked and island characteristics. Standard errors are clustered by export country. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.12: Leading exporters' trade in smart city AI by importers' Polity score

	China exports				*US exports*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: effect by regime type								
Autocracy and weak democracy	-0.004	-0.003	-0.003	0.000	-0.003	-0.002	0.002	-0.002
	(0.003)	(0.003)	(0.005)	(0.003)	(0.004)	(0.005)	(0.005)	(0.004)
AI	-0.635***	-0.644***	-0.240	-0.631***	-0.819***	-0.819***	-0.822***	-0.827***
	(0.100)	(0.102)	(0.835)	(0.100)	(0.065)	(0.065)	(0.065)	(0.063)
Autocracy and weak democracy X AI	0.243**	0.292***	0.233*	0.250**	0.023	0.021	0.035	0.001
	(0.106)	(0.104)	(0.124)	(0.111)	(0.081)	(0.081)	(0.082)	(0.084)
N	2394	2394	2394	2394	2394	2394	2394	2394
Panel B: horserace regime type and aid relationship								
Autocracy and weak democracy	-0.005	-0.004	-0.004	-0.001	-0.005	-0.004	-0.001	-0.005
	(0.003)	(0.003)	(0.005)	(0.003)	(0.004)	(0.005)	(0.005)	(0.005)
AI	-0.624***	-0.619***	-0.170	-0.620***	-0.830***	-0.829***	-0.831***	-0.835***
	(0.103)	(0.103)	(0.851)	(0.103)	(0.065)	(0.065)	(0.066)	(0.063)
Autocracy and weak democracy X AI	0.227**	0.263**	0.212*	0.235**	0.043	0.041	0.053	0.016
	(0.110)	(0.108)	(0.127)	(0.114)	(0.081)	(0.082)	(0.083)	(0.084)
Aid from exporter to importer	0.001	0.001	0.000	0.001	0.003**	0.003**	0.003***	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
AI X aid	0.017	0.029	0.017	0.017	-0.027	-0.026	-0.026	-0.020
	(0.050)	(0.039)	(0.050)	(0.050)	(0.023)	(0.023)	(0.023)	(0.025)
N	2394	2394	2394	2394	2394	2394	2394	2394
Log importer GDP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No	No	Yes	No	No
Institutional characteristics	No	No	Yes	No	No	No	Yes	No
Geographical characteristics	No	No	No	Yes	No	No	No	Yes

Notes: Regression at the product-import country level. Outcome is dummy for trade in smart city AI. Omitted: destination mature democracy X not AI. All columns control for importer GDP and log distance. Panel B additionally interacts AI by the standardized amount of total aid given to the importer. Columns (2) and (6) add controls for common border and shared colonial background. Columns (3) and (7) add controls for legal system and religion. Columns (4) and (8) add controls for landlocked and island characteristics. Standard errors are clustered by export country. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.13: Leading exporters' trade in AI by importers' Polity score and aid relationship — alternative definitions for aid

	China exports			
	(1)	(2)	(3)	(4)
Panel A: official development assistance (ODA)				
Autocracy and weak democracy	-0.005	-0.004	-0.003	-0.000
	(0.003)	(0.003)	(0.005)	(0.003)
AI	-0.589***	-0.586***	-0.510	-0.590***
	(0.097)	(0.100)	(0.802)	(0.095)
Autocracy and weak democracy X AI	0.197*	0.242**	0.196	0.204*
	(0.105)	(0.103)	(0.123)	(0.111)
Aid from exporter to importer	0.001	0.001	0.001	0.000
	(0.003)	(0.003)	(0.003)	(0.003)
AI X aid	0.047	0.044	0.047	0.046
	(0.045)	(0.044)	(0.045)	(0.044)
N	2394	2394	2394	2394
Panel B: finance				
Autocracy and weak democracy	-0.005	-0.004	-0.004	-0.001
	(0.003)	(0.003)	(0.005)	(0.003)
AI	-0.582***	-0.582***	-0.555	-0.582***
	(0.098)	(0.102)	(0.795)	(0.097)
Autocracy and weak democracy X AI	0.197*	0.244**	0.199	0.207*
	(0.106)	(0.105)	(0.123)	(0.110)
Aid from exporter to importer	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
AI X aid	0.036*	0.030	0.036*	0.037*
	(0.021)	(0.021)	(0.020)	(0.021)
N	2394	2394	2394	2394
Panel C: other official flows (OOF)				
Autocracy and weak democracy	-0.004	-0.004	-0.003	-0.000
	(0.003)	(0.003)	(0.005)	(0.003)
AI	-0.607***	-0.592***	-0.620	-0.607***
	(0.100)	(0.102)	(0.811)	(0.099)
Autocracy and weak democracy X AI	0.231**	0.261**	0.237*	0.239**
	(0.104)	(0.105)	(0.122)	(0.109)
Aid from exporter to importer	0.000	0.001	0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
AI X aid	-0.012	0.006	-0.013	-0.011
	(0.050)	(0.039)	(0.051)	(0.050)
N	2394	2394	2394	2394
Log importer GDP	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No
Institutional characteristics	No	No	Yes	No
Geographical characteristics	No	No	No	Yes

Notes: Outcome is dummy for trade. Omitted: destination mature democracy X not AI. All columns control for importer GDP and log distance. Instead of using the standardized amount of total aid China gives to the importer, as in Table 3, Panel A uses standardized official development assistance (ODA), Panel B uses financial funding, and Panel C uses other official flows (OOF). Column (2) adds controls for common border and shared colonial background. Column (3) adds controls for legal system and religion. Columns (4) adds controls for landlocked and island characteristics. Standard errors are clustered by export country. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.14: China exports to countries by importers' AI investment

	AI import deals (all)				AI import deals (smart city)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Destination — autocracies and weak democracies								
Origin China	0.035***	0.035***	0.035***	0.035***	0.032***	0.032***	0.032***	0.032***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Destination total AI investment	-0.012*	-0.013**	-0.012*	-0.013**	-0.011*	-0.011*	-0.011*	-0.011*
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Origin China X destination AI invest	-0.159***	-0.159***	-0.159***	-0.159***	-0.133***	-0.133***	-0.133***	-0.133***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
N	4335	4335	4335	4335	4335	4335	4335	4335
Log importer GDP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log distance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Border/trade characteristics	No	Yes	No	No	No	Yes	No	No
Institutional characteristics	No	No	Yes	No	No	No	Yes	No
Geographical characteristics	No	No	No	Yes	No	No	No	Yes

Notes: Regressions are at the import country-export country level, only keeping import countries with Polity score below 7. Outcomes are dummy for trade. Origin China and Destination AI investment are standardized. All columns control for importer GDP and log distance. Columns (2) and (6) add controls for common border and shared colonial background. Columns (3) and (7) add controls for legal system and religion. Columns (4) and (8) add controls for landlocked and island characteristics. Standard errors are clustered by destination country. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.15: Local unrest on frontier trade to autocracies and weak democracies

	Import deals in frontier tech			
	(1)	(2)		
AI 2 years before unrest	0.079	0.052	0.053	0.053
	(0.050)	(0.034)	(0.034)	(0.032)
AI same year as unrest	0.023	0.056	0.038	0.039
	(0.061)	(0.071)	(0.065)	(0.065)
AI 1 year after unrest	-0.017	-0.008	-0.007	-0.007
	(0.017)	(0.018)	(0.018)	(0.017)
AI 2 years after unrest	-0.016	-0.016	-0.028	-0.029
	(0.019)	(0.023)	(0.025)	(0.027)
N	1226	1226	1226	1200
Country time trend	No	Yes	Yes	Yes
Total trade	No	No	Yes	Yes
Log importer GDP	No	No	No	Yes

Notes: Regressions are at the country-year level, stacked so that the independent variable (unrest) vary within an observation. Unrest is standardized. Trade deals is a dummy for above average frontier technology exports from China. A Polity score of 7 is used as the cutoff for a 'full democracy' by the Polity IV project (Marshall et al., 2016), which we use to distinguish mature and weak democracies. Residualized number of trade deals relative to year = 0 and controlling for AI 1 year before unrest X year. All columns have fixed effects for import country and year. Standard errors are clustered at the import country level. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.16: Local unrest on AI and frontier trade to autocracies and weak democracies — exports from the US

	AI import deals (all)				AI import deals (smart city)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AI 2 years before unrest	0.071	0.056	0.051	0.053	0.058	0.073	0.072	0.076
	(0.055)	(0.080)	(0.081)	(0.083)	(0.057)	(0.073)	(0.074)	(0.074)
AI same year as unrest	0.110	0.236	0.229	0.236*	0.048	0.146	0.145	0.155
	(0.152)	(0.142)	(0.139)	(0.139)	(0.123)	(0.126)	(0.126)	(0.127)
AI 1 year after unrest	-0.165*	-0.129	-0.129	-0.132	-0.073	-0.062	-0.062	-0.066
	(0.096)	(0.086)	(0.085)	(0.086)	(0.047)	(0.059)	(0.059)	(0.059)
AI 2 years after unrest	0.175	0.075	0.069	0.074	0.039	0.043	0.042	0.047
	(0.139)	(0.068)	(0.071)	(0.072)	(0.056)	(0.080)	(0.081)	(0.082)
N	1226	1226	1226	1200	1226	1226	1226	1200
Country time trend	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Total trade	No	No	Yes	Yes	No	No	Yes	Yes
Log importer GDP	No	No	No	Yes	No	No	No	Yes

Notes: Regressions are at the country-year level, stacked so that the independent variable (unrest) vary within an observation. Unrest is standardized. Trade deals are exports from the US. A Polity score of 7 is used as the cutoff for a 'full democracy' by the Polity IV project (Marshall et al., 2016), which we use to distinguish mature and weak democracies. We restrict the analysis to import countries with a polity score below 7. Residualized number of trade deals relative to year = 0 and controlling for AI 1 year before unrest X year. All columns have fixed effects for import country and year. Standard errors are clustered at the import country level. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.17: Local unrest on AI and frontier trade to mature democracies

	AI import deals (all)				AI import deals (smart city)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AI 2 years before unrest	0.021	0.028	0.029	0.027	0.023	0.031	0.032	0.031
	(0.038)	(0.041)	(0.041)	(0.042)	(0.041)	(0.045)	(0.046)	(0.046)
AI same year as unrest	-0.055	-0.074	-0.072	-0.071	-0.047	-0.059	-0.057	-0.057
	(0.049)	(0.053)	(0.053)	(0.053)	(0.053)	(0.054)	(0.053)	(0.053)
AI 1 year after unrest	0.009	0.010	0.010	0.009	-0.008	-0.007	-0.007	-0.008
	(0.021)	(0.026)	(0.026)	(0.026)	(0.010)	(0.015)	(0.015)	(0.015)
AI 2 years after unrest	-0.008	-0.025	-0.025	-0.026	-0.000	-0.019	-0.019	-0.020
	(0.024)	(0.035)	(0.035)	(0.035)	(0.020)	(0.035)	(0.035)	(0.035)
N	1474	1474	1474	1448	1474	1474	1474	1448
Country time trend	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Total trade	No	No	Yes	Yes	No	No	Yes	Yes
Log importer GDP	No	No	No	Yes	No	No	No	Yes

Notes: Regressions are at the country-year level, stacked so that the independent variable (unrest) vary within an observation. Unrest is standardized. Trade deals is a dummy for any export from China. A Polity score of 7 is used as the cutoff for a 'full democracy' by the Polity IV project (Marshall et al., 2016), which we use to distinguish mature and weak democracies. Residualized number of trade deals relative to year = 0 and controlling for AI 1 year before unrest X year. All columns have fixed effects for import country and year. Standard errors are clustered at the import country level. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.18: Local unrest and AI imports on electoral outcomes—sub-indices

	Political institutional quality				
	(1)	(2)	(3)	(4)	(5)
Panel A.1: index for fair elections, imports by autocracies and weak democracies					
AI imports during high unrest	0.091	-0.241	-0.241	-0.323	0.105
	(0.340)	(0.289)	(0.285)	(0.262)	(0.297)
N	46	46	46	46	46
Panel A.2: index for fair elections, imports by mature democracies					
AI imports during high unrest	0.024	-0.243**	0.023	0.211	0.480**
	(0.028)	(0.096)	(0.197)	(0.190)	(0.208)
N	45	45	45	45	45
Panel B.1: index for no media bias, imports by autocracies and weak democracies					
AI imports during high unrest	-0.357*	-0.389*	-0.395*	-0.373	-0.340
	(0.213)	(0.210)	(0.237)	(0.241)	(0.247)
N	46	46	46	46	46
Panel B.2: index for no media bias, imports by mature democracies					
AI imports during high unrest	-0.053	-0.006	-0.388	-0.470*	-0.464
	(0.041)	(0.097)	(0.277)	(0.242)	(0.300)
N	45	45	45	45	45
Panel C.1: index for peaceful elections, imports by autocracies and weak democracies					
AI imports during high unrest	-0.774***	-0.662***	-0.662***	-0.671***	-0.806***
	(0.197)	(0.215)	(0.216)	(0.209)	(0.226)
N	46	46	46	46	46
Panel C.2: index for peaceful elections, imports by mature democracies					
AI imports during high unrest	-0.014	-0.109**	-0.482***	-0.431***	-0.315**
	(0.013)	(0.053)	(0.180)	(0.160)	(0.123)
N	45	45	45	45	45
Panel D.1: index for election montiors, imports by autocracies and weak democracies					
AI imports during high unrest	-0.473***	-0.372***	-0.370**	-0.350**	-0.425***
	(0.107)	(0.142)	(0.148)	(0.143)	(0.116)
N	46	46	46	46	46
Panel D.2: index for election montiors, imports by mature democracies					
AI imports during high unrest	0.121***	0.112	-0.020	0.144	0.216
	(0.022)	(0.104)	(0.259)	(0.221)	(0.222)
N	45	45	45	45	45
Total AI	No	Yes	Yes	Yes	Yes
Total unrest	No	No	Yes	Yes	Yes
Total trade	No	No	No	Yes	Yes
Log importer GDP	No	No	No	No	Yes

Notes: Regressions are at the country level. AI imports during high unrest is the standardized number of AI imports from China when unrest is over one standard deviation above the mean. Outcomes are the change in an inverse covariance weighted index of electoral outcomes from NELDA between the period before AI exports begin (2005-2007) and the last years for which NELDA data are available (2018-2020), where positive changes reflect improving institutional quality. The specific variables that enter the index are described in footnote A.1. Total AI is the total number of AI exports from China. A Polity score of 7 is used as the cutoff for a 'full democracy' by the Polity IV project (Marshall et al., 2016), which we use to distinguish mature and weak democracies. Standard errors are robust. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.19: Local unrest and smart city AI imports on electoral outcomes

	Political institutional quality				
	(1)	(2)	(3)	(4)	(5)
Panel A: imports by autocracies and weak democracies					
AI imports during high unrest	-0.206	-0.205	-0.204	-0.202	-0.192
	(0.240)	(0.287)	(0.283)	(0.284)	(0.217)
N	46	46	46	46	46
Panel B: imports by mature democracies					
AI imports during high unrest	0.044	0.001	0.115	0.113	0.062*
	(0.123)	(0.151)	(0.101)	(0.094)	(0.036)
N	45	45	45	45	45
Total AI	No	Yes	Yes	Yes	Yes
Total unrest	No	No	Yes	Yes	Yes
Total trade	No	No	No	Yes	Yes
Log importer GDP	No	No	No	No	Yes

Notes: Regressions are at the country level. AI imports during high unrest is the standardized number of smart city AI imports from China when unrest is over one standard deviation above the mean. Outcomes are the change in an inverse covariance weighted index of electoral outcomes from NELDA between the period before AI exports begin (2005-2007) and the last years for which NELDA data are available (2018-2020), where positive changes reflect improving institutional quality. The specific variables that enter the index are described in footnote A.1. Total AI is the total number of AI exports from China. A Polity score of 7 is used as the cutoff for a 'full democracy' by the Polity IV project (Marshall et al., 2016), which we use to distinguish mature and weak democracies. Standard errors are robust. * significant at 10% ** significant at 5% *** significant at 1%.

Table A.20: Local unrest and AI imports on electoral outcomes, Chinese AI in autocracies and weak democracies

	Political institutional quality					
	AI import deals (all)			AI import deals (smart city)		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: overall index						
AI imports	0.028	0.028	0.027	0.029	0.029	0.028
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Unrest	0.009	0.069	0.089	0.007	0.067	0.087
	(0.152)	(0.172)	(0.172)	(0.152)	(0.172)	(0.173)
AI X unrest	-0.106***	-0.114***	-0.115***	-0.121***	-0.120***	-0.121***
	(0.032)	(0.031)	(0.032)	(0.032)	(0.030)	(0.030)
N	1052	1032	1032	1052	1032	1032
Panel B: index for fair elections						
AI imports	0.021	0.021	0.021	0.023	0.023	0.022
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Unrest	0.019	0.074	0.090	0.015	0.070	0.087
	(0.114)	(0.139)	(0.140)	(0.114)	(0.139)	(0.140)
AI X unrest	-0.107***	-0.116***	-0.117***	-0.143***	-0.141***	-0.142***
	(0.031)	(0.027)	(0.027)	(0.028)	(0.026)	(0.027)
N	1052	1032	1032	1052	1032	1032
Panel C: index for no media bias						
AI imports	0.012	0.012	0.010	0.013	0.013	0.011
	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
Unrest	0.182	0.170	0.227	0.178	0.165	0.222
	(0.188)	(0.194)	(0.175)	(0.188)	(0.194)	(0.175)
AI X unrest	-0.068	-0.066	-0.070	-0.112**	-0.113**	-0.116**
	(0.046)	(0.047)	(0.049)	(0.046)	(0.048)	(0.051)
N	1052	1032	1032	1052	1032	1032
Panel D: index for peaceful elections						
AI imports	0.027	0.026	0.026	0.028	0.027	0.027
	(0.024)	(0.025)	(0.025)	(0.024)	(0.025)	(0.025)
Unrest	-0.166	-0.177	-0.188	-0.166	-0.178	-0.190
	(0.176)	(0.209)	(0.205)	(0.175)	(0.209)	(0.205)
AI X unrest	-0.128***	-0.129***	-0.128***	-0.128*	-0.130*	-0.129*
	(0.039)	(0.039)	(0.039)	(0.067)	(0.068)	(0.068)
N	1052	1032	1032	1052	1032	1032
Panel E: index for election monitors						
AI imports	0.006	0.007	0.004	0.006	0.007	0.005
	(0.021)	(0.021)	(0.020)	(0.021)	(0.021)	(0.020)
Unrest	0.053	0.074	0.145	0.050	0.071	0.142
	(0.267)	(0.286)	(0.267)	(0.268)	(0.287)	(0.268)
AI X unrest	-0.013	-0.014	-0.018	-0.046	-0.045	-0.049
	(0.038)	(0.038)	(0.037)	(0.050)	(0.050)	(0.047)
N	1052	1032	1032	1052	1032	1032
Country time trend	Yes	Yes	Yes	Yes	Yes	Yes
Total trade	Yes	Yes	Yes	Yes	Yes	Yes
Log importer GDP	No	Yes	Yes	No	Yes	Yes
Gov. revenue	No	No	Yes	No	No	Yes

Notes: Regressions are at the country-year level. Unrest and AI imports are standardized. Outcomes are an inverse covariance weighted index of electoral outcomes from NELDA (positive is better) averaged over the 3 years following the unrest/AI imports. The specific variables that enter the index are described in footnote A.1. A Polity score of 7 is used as the cutoff for a 'full democracy' by the Polity IV project (Marshall et al., 2016), which we use to distinguish mature and weak democracies. Index is inverse covariance weighted. All columns have fixed effects for import country and year. Standard errors are clustered at the import country level. * significant at 10% ** significant at 5% *** significant at 1%.