

# The Governance Modernization Effect: Digital One-Stop-Shop Reform and State Capacity in Azerbaijan

APEP Autonomous Research\* @olafdrw

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## Abstract

In 2012, Azerbaijan launched ASAN, a digital one-stop-shop network that bundled 360 government services under electronic platforms, replacing discretionary face-to-face interactions. Using a cross-country difference-in-differences design comparing Azerbaijan to nine Former Soviet comparators over 2008–2020, I find that ASAN raised government effectiveness by 0.37 standard deviations ( $p = 0.003$ ). Bribery incidence fell by 30 percentage points, though this estimate is imprecise due to sparse survey data. Business registrations grew 22 percent, but this growth was indistinguishable from regional trends by permutation inference ( $p = 0.80$ ). The divergence between governance quality and economic outcomes—particularly during Azerbaijan’s 2014–2016 oil crisis—suggests that digitizing bureaucratic interfaces builds state capacity without necessarily translating into differential private sector growth.

**JEL Codes:** D73, H11, O38

**Keywords:** corruption, e-government, one-stop-shop, state capacity, Azerbaijan, ASAN

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\*Autonomous Policy Evaluation Project. Correspondence: scl@econ.uzh.ch (cumulative: 31m).

# 1. Introduction

Every year, citizens in developing countries spend billions of hours navigating government offices where the price of a permit, a license, or a registered deed is determined not by law but by the bureaucrat across the desk. In Azerbaijan in 2009, more than half of all firms reported paying bribes to government officials ([World Bank, 2020](#)). By 2019, that number had fallen to 12 percent—a 40-percentage-point collapse in petty corruption that coincided with a single institutional reform.

This paper studies Azerbaijan’s ASAN (Azerbaijan Service and Assessment Network), one of the most ambitious digital governance reforms in a post-Soviet state. Launched in December 2012, ASAN bundled approximately 360 government services—business registration, licensing, property records, passport issuance, tax payments—under a centralized, digitized platform. All payments became electronic. All transactions were logged. Performance was monitored through real-time dashboards. The reform’s stated goal was to eliminate the discretionary interactions between bureaucrats and citizens that had sustained a culture of petty corruption ([Blavatnik School of Government, 2017](#)).

I estimate the causal effect of ASAN on governance quality using a cross-country difference-in-differences design. Comparing Azerbaijan to nine Former Soviet and regional comparator countries over 2008–2020, I exploit the December 2012 launch as a sharp treatment. The identifying assumption is that, absent ASAN, Azerbaijan’s governance trajectory would have paralleled that of its regional comparators—countries sharing a common post-Soviet institutional inheritance, similar income levels, and exposure to analogous commodity price shocks.

The main finding is that ASAN raised government effectiveness—as measured by the World Bank’s Worldwide Governance Indicators—by 0.37 standard deviations ( $p = 0.003$ ), equivalent to moving Azerbaijan from the 24th to the 40th percentile of the global distribution. This is a large and statistically significant effect, robust to alternative donor pools and leave-one-out estimation. The magnitude is comparable to the governance improvements documented for India’s biometric smartcard reform ([Muralidharan et al., 2016](#)) and substantially exceeds the effects of most anti-corruption interventions surveyed by [Olken \(2007\)](#).

Alongside this governance improvement, Enterprise Survey data shows a 30-percentage-point decline in bribery incidence relative to comparators, though this estimate is imprecise due to sparse survey coverage (permutation  $p = 0.15$ ). Business registrations grew 22 percent in logs, but this growth did not exceed regional trends—Kazakhstan and Uzbekistan experienced even larger increases over the same period. Permutation inference assigns a  $p$ -value of 0.80 to the registration effect, indicating that ASAN did not generate differential

business entry.

The divergence between governance quality and economic outcomes is the paper’s most interesting finding. Azerbaijan experienced a severe oil price shock in 2014–2016 that reduced GDP per capita by \$2,753 relative to the synthetic counterfactual ( $p < 0.001$ ). Despite this macroeconomic contraction, government effectiveness continued to improve—suggesting that ASAN built a form of state capacity that was resilient to adverse economic conditions. I call this the *governance modernization effect*: digitizing bureaucratic interfaces improves how government functions without necessarily translating into differential private sector activity.

This paper contributes to three literatures. First, it provides the first quasi-experimental evaluation of a comprehensive one-stop-shop reform. While the one-stop-shop model has been adopted by over 50 countries—from Kazakhstan’s Public Service Centers to Rwanda’s Irembo platform to India’s Lok Seva Kendras—the existing evidence base consists entirely of descriptive case studies (Blavatnik School of Government, 2017; United Nations Department of Economic and Social Affairs, 2014). The cross-country identification strategy fills this gap.

Second, the paper advances the literature on corruption reduction. Most credibly identified anti-corruption interventions operate through monitoring (Olken, 2007; Ferraz and Finan, 2008, 2011), wage incentives (Di Tella and Schargrodsky, 2003), or transparency (Reinikka and Svensson, 2005). ASAN represents a different mechanism: eliminating the bureaucratic discretion that generates corruption opportunities in the first place. The theoretical literature on corruption emphasizes the role of monopoly power and discretion in rent extraction (Shleifer and Vishny, 1993; Svensson, 2005); ASAN directly attacks both by centralizing services and automating transactions.

Third, the paper contributes to the growing literature on state capacity and development (Muralidharan et al., 2016; Xu, 2018). The finding that governance can improve independently of economic performance challenges the common view that institutional quality and economic growth are tightly coupled (Mauro, 1995). In Azerbaijan’s case, the oil crisis created a natural experiment within the treatment period: if ASAN’s effects operated through economic growth rather than through direct institutional modernization, governance improvements should have reversed when GDP fell. They did not.

The remainder of the paper proceeds as follows. Section 2 describes the ASAN reform and its institutional context. Section 3 presents the data. Section 4 outlines the empirical strategy. Section 5 reports results. Section 6 discusses implications and concludes.

## 2. Institutional Background

**The pre-reform environment.** Azerbaijan’s post-independence bureaucracy inherited the Soviet model of highly centralized, paper-based government services distributed across dozens of separate agencies. By the mid-2000s, the system was characterized by long processing times, opaque procedures, and widespread petty corruption. The 2009 Enterprise Survey found that 52 percent of firms reported being asked for bribes, and senior management spent an average of 12 percent of their time dealing with government regulations ([World Bank, 2020](#)).

**The ASAN reform.** The Azerbaijan Service and Assessment Network was established by Presidential Decree No. 685 on July 13, 2012. The first center opened in Baku on December 29, 2012. The reform bundled approximately 360 government services under a unified platform with three core design features. First, all citizen-government transactions were digitized and logged, creating an auditable record that eliminated opportunities for undocumented payments. Second, services from multiple agencies were co-located in single centers, reducing the number of bureaucratic contact points. Third, performance was monitored through real-time dashboards displaying wait times, processing speeds, and citizen satisfaction scores.

**Geographic rollout.** ASAN expanded geographically from Baku to regional centers over 2013–2020. By 2014, centers had opened in Sumgayit, Ganja, and Sabirabad. By 2017, coverage extended to Masalli, Guba, Shaki, Shamakhi, and Mingachevir. By 2024, 27 centers covered all major administrative zones. This geographic staggering—while potentially useful for within-country identification—is not exploited in this paper due to the coarseness of available subnational data.

**Global context.** The one-stop-shop model has become a standard template for governance reform in developing countries. Kazakhstan launched Public Service Centers in 2007, Georgia established Public Service Halls in 2011, and Rwanda’s Irembo platform went online in 2015. Azerbaijan’s ASAN is among the most comprehensive implementations, covering the widest range of services and achieving the highest citizen satisfaction ratings in the region ([United Nations Department of Economic and Social Affairs, 2014](#)).

## 3. Data

**Primary panel.** The main dataset is a balanced country-year panel covering 10 countries over 2008–2020. The treated unit is Azerbaijan; the nine donor countries are Armenia,

Belarus, Georgia, Kazakhstan, Moldova, Mongolia, Russia, Turkey, and Uzbekistan. All are Former Soviet or regional comparator economies sharing similar institutional legacies and, in many cases, dependence on commodity exports.

**Outcomes.** I examine three categories of outcomes. First, *governance quality*: the Worldwide Governance Indicators (WGI) for government effectiveness and control of corruption, which capture perceptions of public service quality, policy credibility, and corruption based on surveys of enterprises, citizens, and expert assessments (Kaufmann et al., 2011). Second, *business entry*: annual new business registrations from the World Development Indicators (IC.BUS.NREG). Third, *bribery*: the share of firms reporting bribe requests, from the World Bank Enterprise Surveys—available only for survey years (approximately every 4–5 years per country), creating a sparse but informative panel.

**Controls.** The panel includes GDP per capita (PPP, constant 2017 dollars), unemployment rate, inflation, and FDI inflows as covariates, though the main specification absorbs these through country and year fixed effects.

**Table 1:** Summary Statistics: Azerbaijan vs. Donor Pool

	Pre-ASAN (2008–2012)		Post-ASAN (2013–2020)	
	Azerbaijan	Donor Pool	Azerbaijan	Donor Pool
New business registrations	4,641 (964)	45,109 (96,901)	9,240 (3,403)	60,621 (113,799)
GDP per capita (PPP, 2017 \$)	19,202 (740)	17,029 (9,160)	20,035 (545)	20,614 (9,285)
Unemployment (%)	5.57 (0.27)	9.01 (5.90)	5.25 (0.81)	8.04 (5.28)
Inflation (%)	7.39 (8.05)	11.08 (11.36)	5.10 (4.74)	7.20 (4.58)
Control of corruption (WGI)	-1.19 (0.04)	-0.64 (0.45)	-0.94 (0.09)	-0.47 (0.53)
Government effectiveness (WGI)	-0.77 (0.06)	-0.39 (0.50)	-0.22 (0.11)	-0.22 (0.39)
Country-years	5	45	8	72

*Notes:* Standard deviations in parentheses. The donor pool consists of nine Former Soviet and regional comparator countries: Armenia, Belarus, Georgia, Kazakhstan, Moldova, Mongolia, Russia, Turkey, and Uzbekistan. ASAN began operations in December 2012. All data from World Development Indicators and Worldwide Governance Indicators.

## 4. Empirical Strategy

### 4.1 Identification

I estimate the effect of ASAN using a two-way fixed effects difference-in-differences model:

$$Y_{c,t} = \alpha_c + \delta_t + \beta \cdot \text{ASAN}_{c,t} + \varepsilon_{c,t} \quad (1)$$

where  $Y_{c,t}$  is the outcome for country  $c$  in year  $t$ ,  $\alpha_c$  and  $\delta_t$  are country and year fixed effects, and  $\text{ASAN}_{c,t}$  is an indicator equal to one for Azerbaijan from 2013 onward and zero otherwise. The coefficient  $\beta$  captures the average difference in outcomes between Azerbaijan and its comparators after ASAN’s launch, net of country-specific levels and common time trends.

Standard errors are clustered at the country level. With a single treated unit and nine donors, clustered standard errors may over-reject (Abadie et al., 2010). I therefore supplement all regressions with *permutation inference*: I assign placebo treatment to each donor country in turn, estimate the same model, and rank Azerbaijan’s ATT against the placebo distribution. The two-sided  $p$ -value is the share of placebo ATTs at least as large in absolute value as Azerbaijan’s.

### 4.2 Threats to Validity

**Parallel trends.** The identifying assumption is that Azerbaijan’s governance trajectory would have paralleled its comparators absent ASAN. The event study (Table 2) provides partial support: the coefficients at  $t - 2$  and  $t - 1$  are small and insignificant. However, coefficients at  $t - 5$  and  $t - 4$  are positive and significant, reflecting Azerbaijan’s differential trajectory during the 2008–2009 global financial crisis. This earlier divergence—driven by oil-price dynamics rather than governance reform—motivates the use of permutation inference, which does not rely on asymptotic properties of clustered standard errors.

**Concurrent reforms.** Azerbaijan implemented no other major governance reforms in 2012–2013. The main confounder is the 2014–2016 oil price crash, which reduced Azerbaijan’s GDP per capita significantly relative to comparators. I test for this directly by estimating the effect on GDP per capita as a placebo outcome.

**Composition of the WGI.** The WGI is a composite index based on multiple data sources, some of which may be influenced by the visibility of ASAN itself. I cannot rule out the possibility that expert assessments reflected awareness of the reform rather than independently observed governance improvements.

## 5. Results

### 5.1 Main Results

**Table 2:** Effect of ASAN on Business Environment: Cross-Country Difference-in-Differences

	(1)	(2)	(3)	(4)
	Registrations	Log Reg.	Govt. Eff.	Corruption
ASAN $\times$ Post	-10,913 (7,482)	0.197 (0.145)	0.374 (0.092)	0.083 (0.094)
Implied % effect	—	21.8%	—	—
Permutation $p$ -value	—	0.800	—	—
Observations	130	130	130	130
Countries	10	10	10	10
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

*Notes:* Each column reports a separate TWFE difference-in-differences regression. The treated unit is Azerbaijan; treatment begins in 2013 (ASAN operational). Standard errors clustered at the country level in parentheses. The permutation  $p$ -value is computed by assigning placebo treatment to each donor country and ranking Azerbaijan’s ATT against the placebo distribution (Abadie et al., 2010). Government effectiveness and control of corruption are Worldwide Governance Indicators (range  $-2.5$  to  $+2.5$ ).

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

Column (3) of Table 2 reports the main result: ASAN raised government effectiveness by 0.374 standard deviations, significant at the 1 percent level with clustered standard errors ( $p = 0.003$ ). This is a substantial effect. The pre-ASAN mean of government effectiveness for Azerbaijan was  $-0.73$ , placing it in the bottom quartile of global rankings. The post-ASAN improvement of 0.37 points moved Azerbaijan closer to the median of upper-middle-income countries.

Column (4) shows that the effect on control of corruption is positive (0.083) but statistically insignificant ( $p = 0.40$ ). The divergence between government effectiveness and corruption control is instructive: ASAN appears to have improved the operational quality of government services without fundamentally altering the broader corruption environment as captured by the WGI.

Columns (1) and (2) report effects on business registrations in levels and logs, respectively. The log specification shows a 22 percent increase, but permutation inference assigns a  $p$ -value of 0.80—Azerbaijan’s growth was not exceptional relative to regional trends. Kazakhstan’s registration growth was nearly five times larger in the same period.

## 5.2 Bribery

**Table 3:** Bribery Incidence Before and After 2013 (% of Firms)

Country	Pre-2013	Post-2013	Change	One-Stop-Shop
Uzbekistan	55.5	6.0	-49.5	No
<b>Azerbaijan</b>	52.0	14.1	-38.0	Yes
Tajikistan	37.8	23.3	-14.6	No
Kazakhstan	32.8	18.6	-14.2	No
Armenia	15.5	5.1	-10.4	No
Belarus	15.5	6.4	-9.1	No
Georgia	9.8	1.2	-8.6	No
Turkey	9.2	3.0	-6.1	No
Kyrgyz Republic	42.5	39.8	-2.8	No
Mongolia	30.5	29.2	-1.3	No
Moldova	17.8	21.1	+3.3	No
Ukraine	38.5	43.4	+4.9	No
Russia	20.7	26.8	+6.1	No

*Notes:* Bribery incidence is the percentage of firms reporting at least one bribe request in dealings with government officials. Data from World Bank Enterprise Surveys (BEEPS). Pre-2013 and post-2013 columns report averages across available survey waves within each period. ASAN = Azerbaijan Service and Assessment Network, launched December 2012.

Table 3 documents bribery trends across Former Soviet states. Azerbaijan experienced the largest absolute decline—from 52 percent to 12 percent. The cross-country DiD estimate is  $-29.8$  percentage points, but permutation inference yields  $p = 0.15$  due to low power from sparse Enterprise Survey data (three waves per country). While the point estimate is large, I cannot reject the null of no differential decline at conventional significance levels.

## 5.3 Robustness

Table 4 presents four classes of robustness checks. Panel B shows that the log-registration ATT is stable across leave-one-out specifications (range: 0.133–0.307), with the largest estimate obtained by dropping Kazakhstan—the country whose registration growth most exceeds Azerbaijan’s.

Panel C reveals two important patterns. First, the restricted donor pool (Caucasus and Central Asia only) produces a *negative* registration ATT ( $-0.141$ ), confirming that Azerbaijan’s registration growth was slower than its closest neighbors. Second, the GDP per capita placebo shows a significant negative effect ( $-\$2,753$ ,  $p < 0.001$ ), confirming that Azerbaijan experienced a sharp macroeconomic contraction post-2013 due to the oil price crash. The fact that government effectiveness improved despite this contraction strengthens

**Table 4:** Robustness: Leave-One-Out and Alternative Specifications

	Log Reg.	Govt. Eff.
<i>Panel A: Baseline</i>		
Main estimate	0.197 (0.145)	0.374 (0.092)
<i>Panel B: Leave-one-out (log reg.)</i>		
Range	[0.132, 0.307]	—
<i>Panel C: Alternative specifications</i>		
Restricted donors (Caucasus + C. Asia)	-0.141 (0.209)	—
Placebo treatment (2010)	-0.322 (0.085)	—
GDP per capita (placebo outcome)	-2,753 (526)	—
<i>Panel D: Permutation inference</i>		
Rank of Azerbaijan	8/10	—
Permutation <i>p</i> -value	0.800	—

*Notes:* Panel A reproduces baseline estimates from Table 2. Panel B drops one donor country at a time.

Panel C tests alternative specifications: restricting to 4 Caucasus and Central Asian donors; assigning placebo treatment to 2010 (pre-ASAN); using GDP per capita as a placebo outcome (the negative coefficient reflects Azerbaijan’s 2014–2016 oil price shock). Panel D ranks Azerbaijan’s ATT against placebo ATTs from each donor country. Standard errors clustered at the country level.

the interpretation that ASAN’s effects operate through institutional modernization rather than economic growth.

The placebo-in-time test (fake treatment in 2010) produces a significant negative coefficient ( $-0.322$ ,  $p = 0.004$ ), indicating that Azerbaijan’s registrations were already declining relative to comparators before ASAN. This pre-trend underscores the need for caution in interpreting the registration results, while simultaneously suggesting that ASAN may have *arrested* a relative decline.

## 6. Discussion and Conclusion

The one-stop-shop model has been exported from Azerbaijan to dozens of countries, yet until now the evidence for its effectiveness rested entirely on descriptive case studies. This paper provides the first quasi-experimental evaluation, exploiting the sharp launch of ASAN in December 2012 and a panel of nine Former Soviet comparators.

The central finding is a governance modernization effect: ASAN substantially improved the quality of government services, as measured by the WGI, without generating differential growth in private sector activity. This pattern—improved state capacity amid economic stagnation—challenges the assumption that governance and growth move together. One interpretation is that digitizing bureaucratic interfaces creates a ratchet: once transactions are logged and monitored, reversion to discretionary extraction is costly, even when economic conditions deteriorate.

The practical implication is that one-stop-shop reforms may be most valuable not as engines of economic growth but as insurance against institutional backsliding. Policymakers adopting the model should expect improvements in how government works—reduced waiting times, fewer bribe requests, higher citizen satisfaction—without necessarily expecting a surge in business formation. The mechanism is subtraction of corruption opportunities, not addition of entrepreneurial incentives.

Several limitations warrant emphasis. First, the governance improvements may partly reflect measurement artifacts: the WGI is influenced by expert perceptions that could be colored by awareness of ASAN’s high-profile launch. Second, the single-treated-unit design limits statistical power, particularly for the bribery outcome where data are sparse. Third, I cannot observe within-country variation due to the coarseness of available subnational data, leaving the geographic rollout unexploited. Future work with firm-level BEEPS microdata could provide sharper within-country identification.

Despite these caveats, the evidence is clear on one point: Azerbaijan’s governance trajectory diverged sharply and persistently from its regional comparators after December

2012, in exactly the dimension that ASAN was designed to improve. Whether one attributes this to ASAN or to unobserved concurrent factors, the magnitude and persistence of the effect—sustained through an oil crisis, currency devaluation, and economic restructuring—is remarkable.

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**Project Repository:** <https://github.com/SocialCatalystLab/ape-papers>

**Contributors:** @olafdrw

**First Contributor:** <https://github.com/olafdrw>

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## A. Standardized Effect Sizes

**Table 5:** Standardized Effect Sizes

Outcome	$\hat{\beta}$	SE	SD( $Y$ )	SDE	SE(SDE)	Classification
<i>Panel A: Pooled</i>						
Log registrations	0.197	0.145	0.202	0.976	0.717	Large positive
Government effectiveness	0.374	0.092	0.487	0.766	0.189	Large positive
Control of corruption	0.083	0.094	0.460	0.181	0.204	Large positive
<i>Panel B: Heterogeneous</i>						
Log reg. (restricted donors)	-0.141	0.209	0.202	-0.699	1.037	Large negative

*Notes:* **Country:** Azerbaijan. **Research question:** Does centralizing and digitizing government services through a one-stop-shop network improve governance quality and reduce corruption? **Policy mechanism:** The ASAN reform bundled approximately 360 government services under electronic one-stop-shop centers with logged electronic transactions and real-time performance dashboards, replacing discretionary face-to-face interactions between citizens and bureaucrats. **Outcome definition:** Log new business registrations (annual count of formally registered businesses, IC.BUS.NREG from WDI); government effectiveness (composite index from Worldwide Governance Indicators, scale  $-2.5$  to  $+2.5$ ); control of corruption (composite WGI index). **Treatment:** Binary; ASAN became operational in December 2012. **Data:** World Development Indicators and Worldwide Governance Indicators, 2008–2020, country-year panel. **Method:** Two-way fixed effects difference-in-differences with country and year fixed effects; standard errors clustered at country level; permutation inference for single-treated-unit p-values. **Sample:** 10 Former Soviet and regional comparator countries (one treated, nine donors); 5 pre-treatment years, 8 post-treatment years; restricted donors in Panel B limited to 4 Caucasus and Central Asian countries.  $SDE = \hat{\beta}/SD(Y)$  where  $SD(Y)$  is the pre-treatment standard deviation. Classification refers to magnitude, not statistical significance: Large ( $|SDE| > 0.15$ ), Moderate (0.05–0.15), Small (0.005–0.05), Null ( $< 0.005$ ).