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Market concentration in an oil economy: firm-level evidence from Kazakhstan

David R. DeRemer[1], Aigerim Yergabulova[2*]

Abstract
Market concentration is widely used to screen for market power. If concentration reflects market power, more concentrated industries should earn higher markups, and their leading firms should persist while innovating less. We examine whether measured concentration reflects market power in Kazakhstan, an economy with a large oil sector and extensive state involvement in markets, using administrative data on medium and large enterprises in 67 industries for 2016–2023. Aggregate concentration is moderate and changes little, and almost all of its short-run movement comes from oil and gas. Several of the largest changes in industry concentration come from firms entering or leaving the reporting data. Markups do not rise with concentration, either across industries or within industries over time. State enterprises, which are more prevalent in concentrated industries, report lower markups than private firms. The largest firms in each industry tend to persist, but persistent leaders report innovation activity more often than displaced ones. These results identify features of Kazakhstan that complicate inference of market power from measured concentration at both the aggregate and industry levels, and the greater innovation of persistent leaders similarly complicates inferring market power from persistence.

Keywords: market concentration; Herfindahl–Hirschman index; markups; competition policy; state-owned enterprises; commodity prices; innovation; Kazakhstan.

Introduction

Competition authorities regularly use concentration indices to screen markets for market power, most visibly through the concentration thresholds in merger guidelines (US Department of Justice & Federal Trade Commission, 2010, 2023). The Cournot oligopoly model supports this view that more concentrated industries earn higher price–cost margins (Cowling & Waterson, 1976). Research on advanced economies has also linked rising concentration to rising markups (De Loecker et al., 2020) and to leading firms that are harder to displace and less innovative (Akcigit & Ates, 2021). Concentration is a market outcome, however, and both concentration and the persistence of leading firms can arise for reasons unrelated to market power, including the greater efficiency of the leaders (Demsetz, 1973; Berry et al., 2019; Syverson, 2019). Whether these indicators reflect market power matters especially for countries trying to diversify away from natural resources. Competition policy affects who benefits from the new technologies necessary for economic diversification (Acemoglu & Johnson, 2023), and directing scrutiny at the wrong markets is costly given limited enforcement capacity (see OECD, 2025, for Kazakhstan).

This paper examines whether measured concentration and the persistence of leading firms reflect market power across Kazakhstan's non-financial business economy. The answer matters for how prior firm-level research on Kazakhstan should be understood, because that research shows that a small number of firms dominate the economy (Konings et al., 2023) and interprets this industry concentration as oligopolistic competition that constrains productivity (Adilkhanova et al., 2026).

We focus on three features of Kazakhstan that could weaken the relationships between these indicators and market power. A large oil sector makes revenue-weighted statistics move with world oil prices. The state also directly organizes some markets by reserving activities for designated operators or regulating prices, allowing policy to keep some leading firms in place. The only complete firm-level data come from

[1] Nazarbayev University Graduate School of Business, Astana, Kazakhstan, e-mail: david.deremer@nu.edu.kz, ORCID: https://orcid.org/0000-0002-1314-4033
[2*] Nazarbayev University Graduate School of Business, Astana, Kazakhstan, e-mail: aigerim.yergabulova@nu.edu.kz, ORCID: https://orcid.org/0000-0003-1261-3798 (corresponding author)

administrative reporting forms covering larger firms, so measured concentration changes and leading firms appear to lose their positions when firms enter or leave the reporting frame.

Using confidential administrative data on medium and large enterprises in Kazakhstan's non-financial business economy for 2016–2023, we find that these features complicate inference of market power from measured concentration at both the aggregate and industry levels. The economy-wide Herfindahl–Hirschman index (HHI), a revenue-weighted average of industry indices, is moderate and changes little, and almost all of its short-run movement comes from oil and gas: of the 257-point rise in 2022, only 16 points remain once the sector is excluded. Concentration in individual industries changes substantially over time, rising in some industries and falling in others. Several of the largest changes disappear or reverse among firms present throughout, so they come from firms entering or leaving the reporting data. Markups do not rise with concentration across industries, and within industries, the relation is, if anything, negative over time. Industries with a larger state presence are more concentrated, yet state enterprises report lower markups than private firms.

The persistence of leading firms is also difficult to interpret as market power. Half of the four largest firms in each industry in 2016 were still among the four largest in 2023, a quarter were overtaken by rivals, and the rest left the reporting data or changed industry. Leaders that kept their positions reported innovation activity more often than those overtaken (77.7 percent compared with 50.0 percent). These descriptive comparisons cannot rule out entrenchment, but they suggest that leading firms' persistence reflects greater efficiency.

The paper's main contribution is to identify and measure the channels through which measured concentration and leading firms' persistence can diverge from market power. Measured concentration varies with commodity prices, the reporting frame, and the state's market organization. Fixed-weight series, within-between decompositions, and comparisons among continuing firms measure the commodity and reporting-frame channels directly. They can be applied wherever concentration is computed from larger firms' administrative records. Leading firms' persistence can reflect both efficiency and entrenchment, and separating rival displacement from exit from the reporting data, along with linking leaders to innovation records, helps distinguish the two.

The rest of the article is structured as follows. The next section reviews the literature and presents the conceptual framework. We then describe the institutional background, followed by the data and methods section. The results section first examines concentration and its relation to markups before turning to the persistence and innovation of leading firms. The final section discusses the results and concludes.

Literature and conceptual framework

Related literature

Research on whether concentration indicates market power has focused on the advanced economies. Studies of the United States and Europe find rising concentration and markups (Grullon et al., 2019; De Loecker et al., 2020), with sales shifting toward large firms with low labor shares (Autor et al., 2020), although carefully measured concentration has risen less than headline figures suggest (Bajgar et al., 2025). Demsetz (1973), however, argued that correlations between concentration and profitability say little about conduct, because concentration can arise when some firms are more efficient than others. The modern restatement is that concentration is a market outcome that maps to market power only under strong assumptions (Berry et al., 2019; Syverson, 2019).

Research on the persistence of leading firms asks whether leaders stay on top because they are more efficient (good concentration) or because they are entrenched (bad concentration); Covarrubias et al. (2020) argue that the United States shifted from good to bad concentration after 2000. Akcigit and Ates (2021) link this shift to declining business dynamism, arguing that as leading firms become harder to displace, the incentive to innovate weakens for all firms.

Evidence on either concentration or persistence outside the advanced economies is thinner. Cross-country studies find flat market-power indicators in emerging markets but rely on commercial data that cover their firms poorly (Akcigit et al., 2021; De Loecker & Eeckhout, 2018), and firm-level studies are mostly confined to manufacturing (Rodríguez-Castelán et al., 2020). For Kazakhstan, three recent firm-level studies are directly relevant. Konings et al. (2023) study granularity, how much the largest firms drive aggregate outcomes, and find that the 30 largest firms, concentrated in oil, account for nearly 80 percent of aggregate productivity growth in 2012–2018. Granularity depends on firms' size relative to the whole economy, while concentration concerns firms' size relative to rivals in the same market. Adilkhanova et al.

(2026) use the same reporting forms as this paper for 2009–2017. They find that three to ten firms hold large shares in most agricultural and manufacturing industries, and they treat this concentration as a measure of the intensity of competition. Yergabulova (2026) estimates price–cost margins from administrative records and finds that high margins largely reflect the recovery of fixed costs in a capital-intensive economy, which affects how markups should be compared across industries. None of the three studies assess whether concentration or the persistence of leading firms reflects market power.

Conceptual framework

We consider three explanations for the concentration observed in Kazakhstan's industries and the persistence of their leading firms, each drawn from existing research. Under the efficiency explanation, the most productive firms win large shares. Under the market-power explanation, incumbents hold large shares because they are shielded from challenge. Under the third explanation, state and commodity factors drive share movements: measured shares move with commodity prices and with the state's organization of markets, independently of how firms compete.

We then distinguish among the three explanations using three kinds of evidence, as summarized in Table 1. Although a descriptive analysis cannot establish the mechanism at work in any particular industry, it can identify which combination of predicted patterns best fits the evidence across the economy.

Table 1. Evidence consistent with each explanation of concentration

Evidence	Concentration reflects efficiency	Concentration reflects market power	Concentration reflects state and commodity factors
Drivers of changes in measured concentration	Sales shift toward more productive firms within industries	Entry barriers rise, or conduct becomes less competitive within industries	Oil's revenue weight and oil producers' shares change with world prices; the state assigns positions to designated operators
Relation between concentration and markups	More concentrated industries earn higher markups	More concentrated industries earn higher markups	No relation; regulated and state-organized industries combine high concentration with low markups
Persistence and innovation of leading firms	Leaders keep their positions only while they stay ahead, so persistent leaders innovate more	Leaders keep their positions, earn high markups, and innovate less	Leaders keep positions assigned by policy without earning high markups

The first kind of evidence concerns the drivers of changes in measured concentration. Under the efficiency explanation, sales shift toward more productive firms within industries; under the market-power explanation, entry barriers rise or conduct becomes less competitive. Commodity prices and state organization, by contrast, can change measured concentration without changing market structure. These are concrete mechanisms illustrating the broader point that concentration is a market outcome that need not reflect market power (Berry et al., 2019; Syverson, 2019).

The second kind of evidence is the relation between concentration and markups. The efficiency and market-power explanations share a prediction here: more concentrated industries earn higher price–cost margins. Cowling and Waterson (1976) derive this relation for Cournot competition with a homogeneous product, in which the revenue-weighted average price–cost margin in an industry equals the Herfindahl index, on a 0 to 1 scale, divided by the price elasticity of market demand, and is higher still if firms expect rivals to match their output changes. A markup, the ratio of price to cost, rises whenever the price–cost margin rises, so the same prediction applies to the markups measured in this paper. The relation holds whether large shares arise from lower costs or from protection against entry, which is why it is the standard justification for screening markets by concentration. By contrast, where state and commodity factors operate, markups can be set independently of market structure. Where tariffs are regulated, or prices are set in world

markets, measured markups reflect the regulator or the world price, and state enterprises pursuing objectives other than profit can hold large shares without earning high markups.

The third kind of evidence is the persistence and innovation of leading firms. Here the efficiency and market-power explanations diverge. Under the efficiency explanation (Demsetz, 1973), leaders keep their positions only as long as they remain more productive than rivals, so persistent leaders should be more innovative. Under the market-power explanation, leaders face fewer challenges (Covarrubias et al., 2020), so they persist and earn rents, and the weaker threat of displacement blunts their incentive to innovate (Akcigit & Ates, 2021). And where the state assigns positions to designated operators, leaders persist by policy, whether or not they innovate or earn high markups.

Beyond the explanations in Table 1, an important consideration for our analysis is the reporting frame. Both measured concentration and persistence can change when firms start or stop filing. A new filer can raise or lower an industry's index without changing competition, and a leader that stops filing or changes its recorded industry appears to lose its position without a rival displacing it. Thus, the reporting frame is an additional reason that measured concentration can move independently of competition among firms. Our results address this possibility by comparing continuing firms with all reporters and by separating rival displacement from exit in the data.

Institutional background

Kazakhstan's dependence on oil and extensive state involvement in markets could cause measured concentration to evolve independently of firm-level competition. Oil and gas extraction accounted for roughly a fifth of firms' revenue in our sample in 2016 and 2022, and about a sixth in 2023, and its largest producers are among the granular firms whose performance drives the aggregate economy (Konings et al., 2023). The state shapes Kazakhstan's market structure through ownership, exclusive rights, regulated tariffs, and subsidies. State enterprises operate in at least 20 of 30 sectors, and the largest state holding alone generated roughly 14 percent of gross domestic product in 2021 (OECD, 2024, 2025). OECD assessments stress that competitive neutrality is imperfectly implemented and that single operators and special rights, which reserve an activity for one or a few designated firms, restrict entry and create concentrated structures by design (OECD, 2024, 2025). Regulators govern tariffs in network industries such as electricity and gas (Temirkhanov, 2020). The state also shapes market shares through subsidies: in manufacturing and agriculture, the five largest recipients receive up to about 80 percent of subsidies, and largely the same firms receive them year after year (Adilkhanova et al., 2026). Kazakhstan also matters beyond its borders, producing over half of Central Asia's output and holding roughly two-thirds of the region's inward foreign direct investment (Kapital.kz, 2026a), and other Central Asian and post-Soviet economies share its large state enterprise sectors and state organization of markets (EBRD, 2020; OECD, 2023).

These features matter for policy because Kazakhstan's competition authority regularly uses concentration statistics to analyze market structure (OECD, 2025). The competition regime dates from 1991, during the move away from central planning. The authority was reconstituted in 2020 as the Agency for Protection and Development of Competition (APDC), reporting directly to the President, partly because of concerns about conflicts that arise when the state acts at once as owner, regulator, and competition authority (Temirkhanov, 2020). A 2026–2030 plan would transfer quasi-state assets with combined revenues of 3.4 trillion tenge into the competitive environment, and the authority is preparing amendments that combine stronger control of monopolized markets with a smaller state presence in competitive activities (Kapital.kz, 2026b).

Data and methods

Enterprise data and sample

The main source is the Bureau of National Statistics' (BNS) annual 1-PF enterprise reporting form, a confidential census of medium and large enterprises accessed under a restricted-use agreement. For official statistical purposes, the Entrepreneur Code (2015, Article 24) defines medium enterprises as those with 101 to 250 employees and large enterprises as those with more than 250. In 2016–2022, the years in which the statistical size classifier is available, medium enterprises are just under two-thirds of reporters but hold only 16 to 21 percent of sample revenue, while the roughly 250 firms in the classifier's top band, those with more than 1,000 employees, alone hold 52 to 57 percent. The analysis therefore characterizes the large-firm sector. The window begins in 2016, after the form's reporting threshold was raised in 2015 from more than 50 to more than 100 employees (Adilkhanova et al., 2026), so the frame is defined consistently throughout.

The sample covers the non-financial business economy, two-digit activities 05–82 of the national classifier of economic activities (OKED), which follows the Statistical Classification of Economic Activities in the European Community (NACE), excluding financial services (64–66), and includes state-owned and state-linked firms. After excluding records with missing or non-positive revenue, it contains 25,556 firm-year observations on 5,478 firms, about 3,100 to 3,320 firms per year in 67 industries (Table 2).

Table 2. Sample coverage by year

Year	1-PF firms	Sample revenue, bn KZT	1-T employers	1-T employment, thousand
2016	3,299	32,160	8,680	1,509
2017	3,203	36,890	8,590	1,512
2018	3,130	43,457	8,411	1,525
2019	3,166	48,196	8,456	1,553
2020	3,102	45,302	8,354	1,484
2021	3,101	58,600	8,881	1,481
2022	3,235	75,894	10,238	1,518
2023	3,320	79,515	10,932	1,546

Note — authors' calculations from BNS reporting forms 1-PF and 1-T. Revenue is nominal, in billions of Kazakhstani tenge (KZT). The 1-T employment universe has the same activity coverage as the 1-PF sample.

Concentration measures

Concentration is measured by the revenue-based Herfindahl–Hirschman index (HHI), 10,000 times the sum of squared revenue shares within an industry-year. The aggregate series weights each industry's HHI by its share of sample revenue. Key reference points are 1,500 and 2,500, the thresholds of the 2010 US Horizontal Merger Guidelines (US Department of Justice & Federal Trade Commission, 2010). The 2023 guidelines lower them to 1,000 and 1,800 (US Department of Justice & Federal Trade Commission, 2023). Additional measures are the combined revenue shares of the four and ten largest firms (CR4, CR10).

Concentration measured in these data differs from concentration in the underlying markets. Because small firms are excluded, measured levels are likely to exceed concentration in the full firm population. Industries are national, so concentration overstates market power where imports compete and understates it where markets are regional. To meet confidentiality rules governing access, we mask industry-year cells with fewer than five firms (48 of 536) in all reported statistics, though they remain in economy-wide aggregates. Fifty-nine industries can be reported in both 2016 and 2023. Three industries (tobacco, wood products, and remediation) are masked every year because a very small number of firms hold nearly the entire industry. Hence, the reported tables understate the economy's most extreme concentration.

Markup measures

The primary markup measure is the accounting markup, defined as operating revenue divided by the sum of remuneration and material costs. Firm-level markups are winsorized at the 1st and 99th percentiles within each industry-year and averaged to the industry level with revenue weights.

Accounting markups overstate true markups in capital-intensive industries because they omit the cost of capital, so such industries can show high markups that only cover fixed costs (Yergabulova, 2026). To address this omission, we regress markups on concentration while controlling for capital intensity. We also

repeat the analysis with production-function markups estimated following De Loecker and Warzynski (2012), which do not depend on the cost of capital.

Ownership, innovation, and employment

Ownership comes from the form's ownership classifier. We refer to firms that it records as republican or communal state enterprises as state enterprises. Because the classifier records legal form, it counts state-held joint-stock companies as private, so this group understates the state's presence. Innovation activity comes from the BNS 1-INNOV enterprise innovation survey, which records whether a firm carried out innovation activity in the year; matched on the firm identifier, it covers firms accounting for 89 to 92 percent of sample revenue each year. Employment comes from the 1-T labor reporting form, which covers about 8,000 to 11,000 employers per year: legal entities with more than 100 employees and smaller entities that do not report on the small-enterprise form.

Results

Aggregate concentration and oil

The economy-wide index is the most visible concentration statistic, so the analysis starts with its movement over 2016–2023. Aggregate concentration is moderate and has changed little, and almost all of its short-run movement comes from oil and gas (Fig. 1 and Table 3). That movement follows world prices through oil's revenue weight and the shares of oil producers, as the commodity channel predicts, rather than signaling changing competition among firms.

Figure 1 shows how little the aggregate moves once oil is set aside. The revenue-weighted HHI rose from 1,526 in 2016 to 1,639 in 2023, near the lower edge of the moderately concentrated range, except for a trough of 1,414 in 2020 and a spike to 1,897 in 2022. Excluding oil and gas lowers the series by about a third and removes almost all its movement, leaving only 16 of the 257 points in the 2022 spike. The median industry ends the period close to where it began, at 1,562 against 1,475.

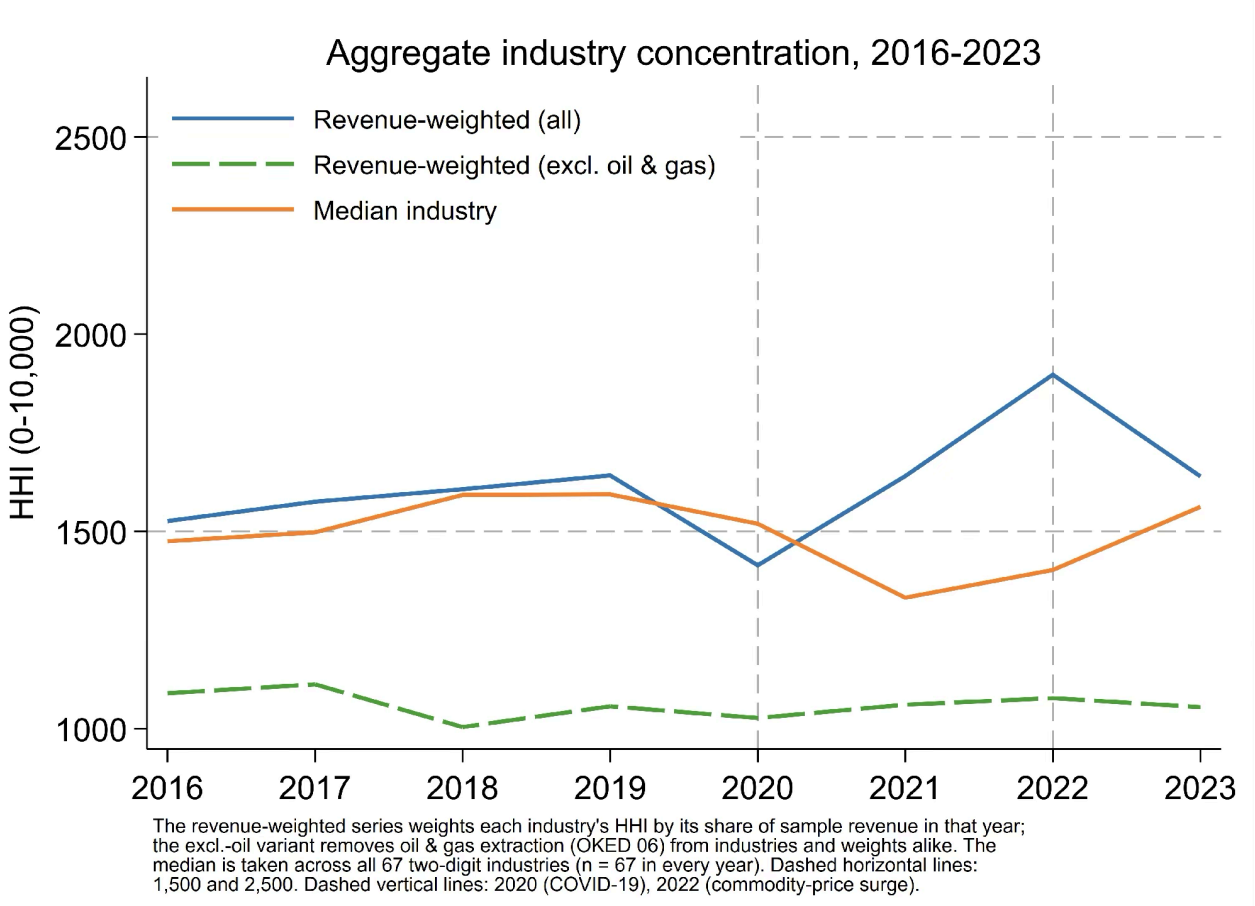


Figure 1. Aggregate concentration, 2016–2023, with and without oil and gas

Note — authors' calculations from BNS reporting form 1-PF.

Table 3 shows how much of the movement comes from changes in industry weights and confirms that other concentration measures show no general rise. Holding each industry's revenue weight at its 2016 or 2019 value shrinks the 2022 spike to 148 or 134 points, so changing weights account for a little under half of it. The revenue-weighted four-firm and ten-firm ratios fell slightly over the period, from 54.3 to 52.9 percent and from 72.3 to 69.4 percent.

Table 3. Aggregate concentration, 2016–2023

Year	HHI, all	HHI, excl. oil and gas	HHI, 2016 weights	HHI, 2019 weights	CR4, %	CR10, %	Median industry HHI
2016	1,526	1,089	1,526	1,561	54.3	72.3	1,475
2017	1,575	1,112	1,430	1,560	54.0	72.7	1,498
2018	1,607	1,004	1,473	1,567	55.4	73.7	1,592
2019	1,642	1,056	1,533	1,642	55.2	73.7	1,594
2020	1,414	1,027	1,510	1,632	51.8	71.1	1,519
2021	1,640	1,061	1,620	1,757	54.5	72.3	1,332
2022	1,897	1,077	1,768	1,891	55.7	71.8	1,402
2023	1,639	1,054	1,670	1,805	52.9	69.4	1,562

Note — authors' calculations from BNS reporting form 1-PF. HHI on the 0–10,000 scale, weighting each industry by its revenue share in the year shown (all industries, or excluding OKED 06) or at fixed 2016 or 2019 shares. CR4 and CR10 are revenue-weighted. The median is across all 67 industries.

To see where the rest of the 2022 spike comes from, we decompose the change in the revenue-weighted index into a between component, which reflects shifts in industries' revenue weights with each industry's index held fixed, a within component, which reflects changes in industry indices with weights held fixed, and a cross term. Of the 257-point rise in 2022, the between component accounts for 142 points, about three-quarters of which come from the larger weight of oil, and the within component accounts for 104 points, most of which come from increased concentration in oil, whose index peaked above 5,000 in 2022 (Fig. 2). The cross-term accounts for the remaining 10 points. Over the full period, the within component (+144) exceeds the total change (+113), so the shifts in weights slightly offset a modest rise within industries. The aggregate index therefore tracks the oil cycle and says little about competition in the rest of the economy.

Industry concentration and the reporting frame

Next, we examine industry indices, since competition authorities primarily focus on industry-level analysis. Unlike the aggregate, concentration in individual industries has changed substantially over time, rising in some industries and falling in others. Several of the largest changes come from firms entering or leaving the reporting data (Table 4). These changes thus reflect the reporting frame rather than market structure.

As a first check on how common large changes are, we compare each reportable industry's index in 2016 and 2023. Large changes are common: 37 percent of industries moved by more than 500 points, with an interquartile range of 481 points. Because a single entrant or exit can move the index sharply in an industry with few firms, we repeat the comparison for the 38 industries with at least 20 reporters in both years. Among them, 28.9 percent moved by more than 500 points, with an interquartile range of 293, so dispersion

is smaller in better-populated industries but remains substantial. Increases in some industries offset decreases in others, so these movements largely cancel out in the aggregate.

Table 4 lists the largest changes and asks whether they survive among firms present in both years, since an index computed among reporting firms changes whenever firms start or stop filing the form. The index for head offices and management consultancy rose by 4,689 points (4,353 among continuing firms). Oil and gas, discussed in the previous subsection because of its weight in the economy rather than the size of its change, recorded increases of 1,318 and 1,301 points, respectively. Accommodation, information services, and other mining also became more concentrated among continuing firms, while veterinary activities and specialized construction became less so. Three large changes, however, reverse or vanish. The rise in scientific research and development disappears among continuing firms, because firms absent in 2016 earned two-thirds of the industry's 2023 revenue, and the rise in employment activities and the fall in office administrative services both reverse sign. For four industries, including motor vehicles and paper products, the change among continuing firms rests on fewer than five firms and cannot be reported. To put these cases in perspective, we regress the change in each reportable industry's index on the change in its number of reporters. The number of reporters explains only 7 percent of the variation, so the reporting frame matters greatly in a few industries rather than modestly in all of them.

Table 4. Largest changes in industry concentration, 2016–2023

OKED	Industry	HHI 2016	HHI 2023	Change	Change, continuing firms	CR4 2023, %	Firms 2016	Firms 2023
70	Head offices; management consultancy	1,755	6,444	+4,689	+4,353	92.3	23	25
72	Scientific research and development	436	3,764	+3,327	−155	70.9	66	40
18	Printing and recorded media	2,353	5,173	+2,819	n.r.	97.9	8	5
06	Crude petroleum and natural gas	3,271	4,589	+1,318	+1,301	82.7	40	43
55	Accommodation	1,441	2,480	+1,039	+2,187	65.8	43	37
32	Other manufacturing	2,460	3,356	+896	n.r.	96.0	9	6
08	Other mining and quarrying	1,015	1,897	+881	+834	70.7	37	28
63	Information service activities	1,054	1,753	+699	+1,172	66.0	26	28
78	Employment activities	897	1,562	+665	−653	54.5	33	59
29	Motor vehicles and trailers	3,234	3,825	+591	n.r.	95.3	6	9
53	Postal and courier activities	6,891	5,352	−1,539	−1,450	89.1	9	9

82	Office administrative and support	6,674	4,881	−1,793	+171	84.5	21	34
17	Paper and paper products	3,222	1,405	−1,817	n.r.	66.1	5	13
43	Specialized construction	3,574	878	−2,696	−4,178	48.2	140	120
75	Veterinary activities	6,355	2,342	−4,013	−2,184	76.6	25	23

Note — authors' calculations from BNS reporting form 1-PF. Ten largest increases and five largest declines among the 59 industries reportable in both years. Continuing firms are those present in both years. n.r.: not reported because fewer than five continuing firms.

Figure 2 turns to the ten largest industries by 2023 revenue, which carry the largest weights in the aggregate. The panels use separate vertical scales, with common reference lines at 1,500 and 2,500. Nine have low, stable concentration, remaining below or near 1,500 throughout: wholesale trade, retail trade, basic metals, metal ores, construction of buildings, civil engineering, land transport, food products, and electricity and gas. The exception is oil and gas, whose rise drives the aggregate spike in 2022. Two of the stable industries illustrate the importance of the state's role. Electricity and gas are tariff-regulated, and land transport includes the national railway operator, so the same index value can mean different things in these industries than in trade or food.

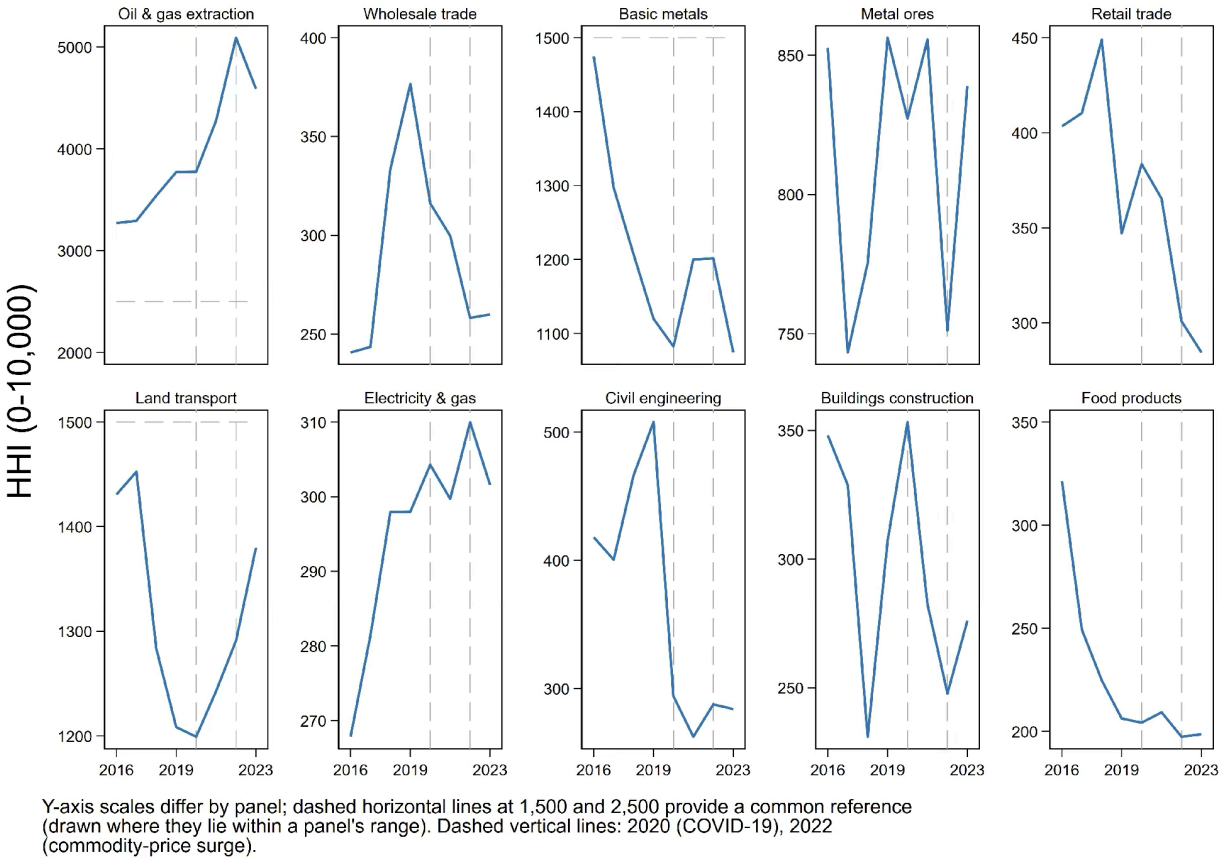


Figure 2. Concentration in the ten largest industries by 2023 revenue

Note — authors' calculations from BNS reporting form 1-PF. Vertical scales differ by panel.

The reporting frame also affects a second statistic often used to track concentration, the share of employment held by the largest employers (Table 5). On the labor form, the largest one percent of employers raised their share of employment from 21.6 percent in 2016 to 27.5 percent in 2023. That group, however, grew from 87 to 110 firms, because the number of employers on the form rose, most sharply in 2022 (Table 2). Holding the group size fixed at 100 employers, the share rose less, from 23.1 to 26.2 percent. Among firms that file both the labor and enterprise forms, the top-100 employment share is nearly flat, at 29.0 and 29.5 percent, while the top-100 revenue share falls.

Table 5. Shares of the largest firms in revenue and employment, 2016 and 2023 (percent)

Measure and frame	Revenue 2016	Revenue 2023	Revenue excl. oil 2016	Revenue excl. oil 2023	Employment 2016	Employment 2023
Largest 1 percent, own frame	41.6	40.1	33.9	32.6	21.6	27.5
Largest 100, own frame	59.0	56.4	52.8	51.1	23.1	26.2
Largest 100, common frame	59.0	56.5	52.8	51.1	29.0	29.5

Note — authors' calculations from BNS reporting forms 1-PF and 1-T. Own frame: revenue shares among 1-PF firms, employment shares among 1-T employers. Common frame: firms filing both forms (3,082 to 3,302 per year, with 66 to 70 percent of 1-T employment).

To see whether the rise in the fixed top-100 series also reflects the reporting frame, we track the series year by year and compare the membership of the largest employers with that of the largest firms by revenue. The entire rise occurred by 2018, coinciding with a redefinition of the labor form, although total employment on the form changes little at that point (Table 2). The 100 largest employers and the 100 largest firms by revenue are largely different, with only 32 firms in common in 2016 and 38 in 2023, so employment and revenue concentration describe different parts of the large-firm sector. We therefore do not treat the rise in employment concentration as evidence about market structure.

Concentration and markups

The central test of whether concentration reflects market power is whether more concentrated industries earn higher markups. Markups do not rise with concentration, either across industries or within industries over time (Fig. 3 and Table 6). This contradicts the predictions of the efficiency and market-power explanations and aligns with state and commodity factors.

Figure 3 compares industries in 2023 and shows no relation between concentration and accounting markups. The fitted line is flat, and the correlation is −0.01 (n = 60; 95 percent confidence interval −0.26 to 0.25). Individual industries show how regulation and state operators break the link. Electricity and gas have the highest markup; they are among the least concentrated industries, with regulated tariffs and high capital intensity. The most concentrated reportable industries, head offices, printing, and postal services, earn ordinary markups, and the postal-services sector earns less than its variable costs, consistent with a national operator carrying universal-service obligations. Information services, moderately concentrated with a high markup, comes closest to the pattern the benchmark predicts, while the office administrative services industry combines high concentration with a markup of 3.8. That markup reflects a single firm with an extreme margin, since the industry's median firm earns a markup of 1.08.

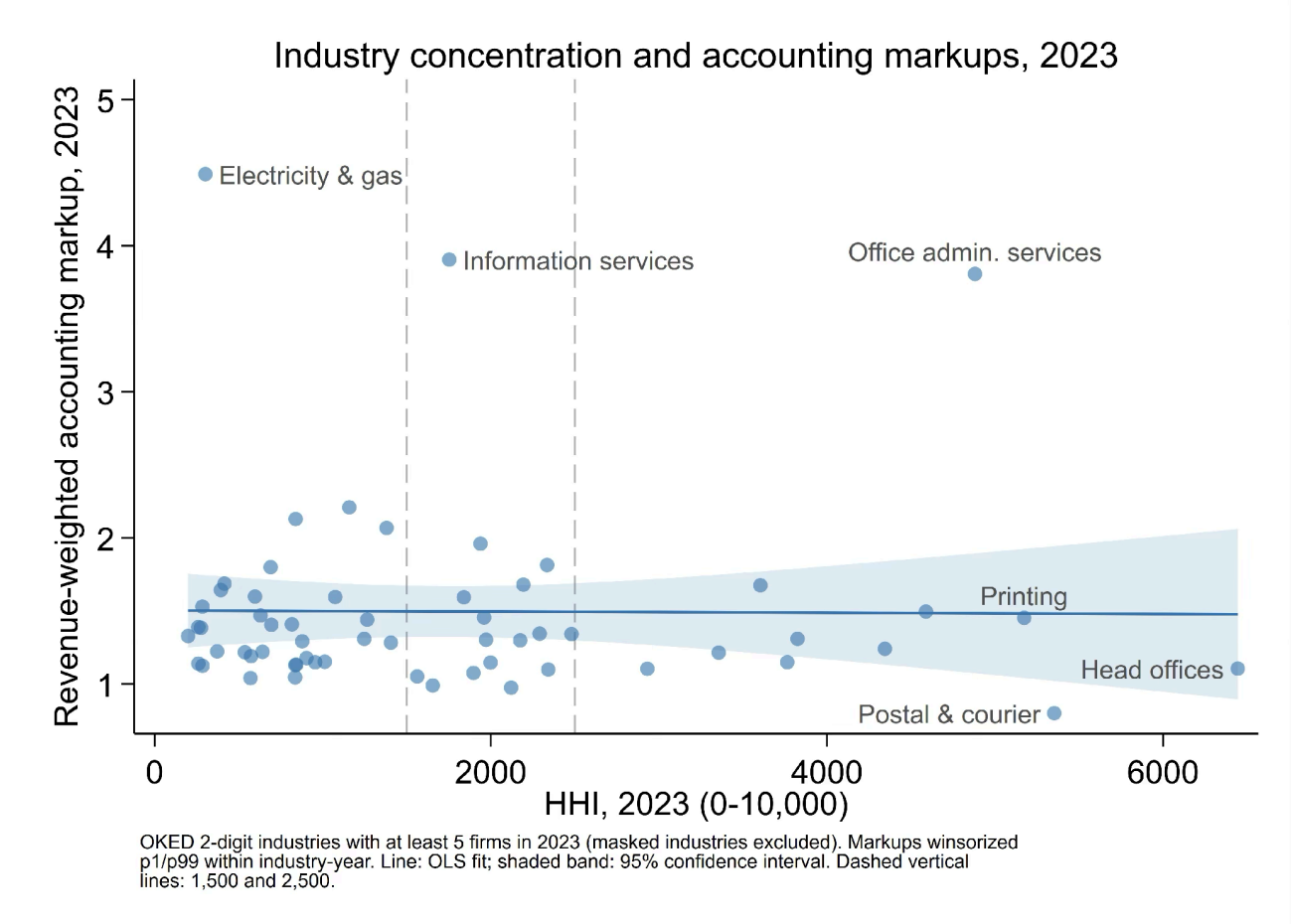


Figure 3. Industry concentration and accounting markups, 2023

Note — authors' calculations from BNS reporting form 1-PF.

Table 6 asks whether the same holds within industries over time, which removes fixed differences between industries such as regulation or capital intensity. The regressions use industry-year data, first with year effects and then with industry and year effects. No coefficient is significantly positive. Accounting markups show no significant relation to concentration in any specification, and neither markup is significantly related to the four-firm ratio. For production-function markups, the within-industry relation with the HHI is negative and significant, and it strengthens when capital intensity and the state's revenue share are controlled for (−0.16 per 1,000 points, p = 0.007). Repeating the regressions with log markups gives the same pattern.

Table 6. Markups and concentration: industry-year panel regressions, 2016–2023

Markup and concentration measure	Year effects	Year effects, controls	Industry and year effects	Industry and year effects, controls
Accounting markup on HHI (per 1,000 points)	−0.023 (0.034)	−0.016 (0.035)	−0.057 (0.054)	−0.085 (0.051)
Accounting markup on CR4 (per 10 points)	−0.018 (0.030)	−0.015 (0.030)	0.038 (0.054)	0.021 (0.058)

Production-function markup on HHI (per 1,000 points)	−0.045 (0.058)	−0.056 (0.060)	−0.104 (0.043)	−0.160 (0.057)
Production-function markup on CR4 (per 10 points)	−0.044 (0.057)	−0.048 (0.056)	−0.021 (0.088)	−0.057 (0.094)

Note — authors' calculations from BNS reporting form 1-PF. Each cell is the coefficient from a separate regression of the revenue-weighted industry markup on the concentration measure, with standard errors clustered by industry in parentheses. Controls are capital intensity (net fixed assets over revenue, industry-year) and the revenue share of state enterprises. N = 488 industry-years in 64 industries.

Table 7 compares ownership groups and shows that state enterprises report the lowest markups. Their median accounting markup was 0.96 in 2016 and 1.03 in 2023, below that of domestic private and foreign firms in both years. State enterprises also account for a small share of sample revenue, 1.2 percent in 2016 and 4.1 percent in 2023, which understates the state's presence, because the classifier records legal form and counts state-held joint-stock companies as private. Counting firms with state participation as state enterprises raises the 2023 share to 7.4 percent, still well below OECD (2024) estimates of the state's economic weight.

Table 7. Ownership groups in the 1-PF sample, 2016 and 2023

Ownership group	Firms 2016	Firms 2023	Revenue share 2016, %	Revenue share 2023, %	Employment share 2016, %	Employment share 2023, %	Median markup 2016	Median markup 2023
State	191	258	1.2	4.1	5.4	8.3	0.96	1.03
Domestic private	2,522	2,395	47.3	53.6	67.6	63.6	1.03	1.08
Foreign	586	648	51.5	42.2	27.0	28.1	1.06	1.10

Note — authors' calculations from BNS reporting form 1-PF. State: republican and communal state enterprises. Domestic private includes firms recorded as having state participation. Foreign: foreign and joint foreign ownership. Ownership is not recorded for 19 firms in 2023, which hold less than 0.1 percent of sample revenue. Employment shares use 1-T employment of firms matched to 1-PF.

To link these low markups to concentration, we compare industries and firms within years, because most of the rise in the state's share in 2022 is a reclassification. Between 2021 and 2022, 82 firms were recoded as state enterprises, accounting for 2.3 of the 2.7-point rise. Within years, industries with larger state revenue shares are more concentrated (correlation +0.36 in 2023, n = 60, p = 0.005). Yet when we regress firm-level log accounting markups on a state-enterprise indicator, using industry-year fixed effects to compare firms in the same industry and year, state enterprises report markups 0.186 log points below private firms (standard error 0.089). Prices may be administered below cost-plus levels, or state enterprises may have higher costs, consistent with evidence that they are less productive than foreign-owned firms (Adilkhanova et al., 2026). Under either explanation, a larger state presence raises measured concentration without raising markups.

Persistence and innovation

The last set of results tracks the four largest firms in each industry from 2016 to 2023 and compares those that kept their positions with those whose rivals overtook them. Leading firms tend to keep their positions, and those that do are more likely to report innovation activity (Table 8). This pattern fits the efficiency explanation better than entrenched market power.

The first panel of Table 8 shows that leading positions are fairly stable, although gross turnover mixes competitive displacement with exit from the data. Of the 236 firms among the four largest in each of the 59 reportable industries in 2016, half were still among the four largest in 2023. Rivals overtook a quarter of them in their own industry, while the rest changed industry code or stopped reporting. Three further checks show that this persistence is broad. It does not come from industries with few reporters, where the four largest firms make up much of the industry, since industries with five to nine reporters retain 57.5 percent of

their leaders, against about 49 percent elsewhere. It does not differ between state enterprises and other firms: 8 of 15 state-enterprise leaders and 111 of 221 other leaders keep their positions. And across industries, it is unrelated to the state's share of industry revenue (correlation −0.09).

The second panel shows similar persistence in revenue ranks beyond the top four. Among firms present in both years, rank correlation within industries averages 0.64, but it conditions on survival, since, on average, only 65 percent of an industry's 20 largest firms in 2016 are still present in 2023. Ranking exiting and reclassified firms last lowers the average to 0.48.

The third panel links leaders to the enterprise innovation survey. Leaders that kept their positions reported innovation activity far more often than leaders overtaken by rivals, 77.7 against 50.0 percent ($p = 0.001$). Across industries, innovation rates are higher where concentration is higher (revenue-weighted correlation 0.44 in 2023), but changes in the two are unrelated, so the pattern reflects which industries are both concentrated and innovative. Persistent leaders in Kazakhstan thus look less like the entrenched incumbents the market-power explanation predicts, which would earn rents and innovate less. However, firms that innovate may also be those best placed to survive for other reasons. The measures follow incumbents among large reporters, so they miss entry and growth by smaller firms, and persistence cannot be measured in the three industries masked in every year.

Table 8. Persistence and innovation among industry leaders, 2016–2023

Statistic	Estimate	n
Fate of 2016 top-four firms by 2023 (percent)		
Still among the four largest	50.4	236
Overtaken by a rival in the same industry	25.8	236
Changed industry code or left the reporting frame	23.7	236
Rank persistence within industries		
Spearman correlation of revenue ranks, surviving firms (mean; median)	0.64; 0.71	50
Same, exiting and reclassified firms ranked last (mean; median)	0.48; 0.47	59
2016 top-20 firms still present in 2023, percent (mean; median)	65; 67	59
Innovation activity		
Ever reported innovation, leaders still among the four largest (percent)	77.7	94
Ever reported innovation, leaders overtaken by rivals (percent)	50.0	48
Correlation of industry innovation rate with HHI, 2023, revenue-weighted (95% CI)	0.44 (0.17 to 0.64)	48
Same, unweighted (95% CI)	0.30 (0.02 to 0.54)	48
Correlation of changes, 2016–2023, revenue-weighted (95% CI)	0.17 (−0.13 to 0.44)	45
Correlation of changes, 2016–2023, unweighted (95% CI)	0.09 (−0.21 to 0.37)	45

Note — authors' calculations from BNS reporting forms 1-PF and 1-INNOV. Innovation statistics use firms matched to 1-INNOV (79 percent of persistent and of overtaken leaders); an industry's innovation rate is the share of matched firms reporting innovation activity, and industries with fewer than five matched firms are excluded. CI: confidence interval.

Discussion and conclusion

The evidence suggests that measured concentration in Kazakhstan's large-firm sector reflects oil prices, changes in which firms report, and the state's role in markets. We find little evidence that measured concentration reflects market power. Movements in the aggregate index come mainly from oil, through both the sector's revenue weight and concentration within it. Several of the largest changes in individual industries disappear or reverse among continuing firms, so they come from firms entering or leaving the reporting data. Markups do not rise with concentration, either across industries or within industries over time, contrary to the prediction shared by the efficiency and market-power explanations. Instead, industries with a larger state presence are more concentrated, while state enterprises earn lower markups than private firms. The persistence of leading firms is also hard to read as market power. Leaders tend to keep their positions, and those that stay innovate more than those displaced by rivals, which fits the efficiency explanation better than entrenchment. Efficiency may therefore help explain which firms stay on top, even though it cannot explain why concentrated industries do not earn higher markups.

These conclusions rest on the most complete firm-level data available for Kazakhstan and on methods suited to a descriptive analysis. A strength of the analysis is that it measures the commodity and reporting-frame channels directly, so their contribution to measured concentration does not depend on assumptions about how firms compete. The analysis is less effective at measuring state involvement because the ownership classifier counts state-held joint-stock companies as private. Because the analysis is descriptive, it cannot identify causal mechanisms. Industries are also defined nationally, which ignores imports and regional markets, and because the reporting frame excludes small firms, entry and growth from below are not observed. Data that follow smaller firms and link firms to their owners would allow a sharper test of the state's role, and data that follow firms' innovation over time would show whether persistent leaders innovate because they are efficient or survive because they innovate. The findings are most likely to carry over to other Central Asian and post-Soviet economies, which share Kazakhstan's large state enterprise sectors and state organization of markets (EBRD, 2020; OECD, 2023).

For the APDC, the main implication is that concentration indices alone are not a reliable basis for setting enforcement priorities. The oil case is easy to recognize, since few authorities would read a national index as a measure of competition in an industry that sells at world prices. The same mechanisms, however, operate less visibly wherever revenue shares respond to prices, tariffs, or administrative decisions. Before a change in concentration is read as a change in competition, the diagnostics used here (fixed-weight series, within-between decompositions, and comparisons among continuing firms) can show whether it comes from commodity prices or from firms entering or leaving the reporting data. Markups provide an additional check, although in regulated and state-organized industries they also reflect administered prices. For innovation policy, central to Kazakhstan's diversification away from resource extraction, the persistence of leading firms should likewise not be read by itself as entrenchment, since these data show that persistent leaders are the more innovative ones. Kazakhstan's plan to transfer quasi-state assets into the competitive environment over 2026–2030 offers an early opportunity to apply these lessons. If the transfers increase competition, the effect should appear in the markups of the affected industries as well as in their concentration, and the measures developed here provide a baseline for that assessment.

Data availability statement. The firm-level data used in this study are confidential administrative records of the Bureau of National Statistics of the Republic of Kazakhstan and therefore cannot be made publicly available. All statistics reported in the paper are aggregated at the industry level, and cells containing fewer than five firms are suppressed in accordance with the confidentiality requirements governing access to the data.

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