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OIL, MONARCHIES, AND BANK CONCENTRATION: EVIDENCE FROM THE 2008 GLOBAL FINANCIAL CRISIS

SAM HOUDI AND ADEEL MALIK

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Oil, Monarchies, and Bank Concentration: Evidence from the 2008 Global Financial Crisis

Sam Houdi
Independent Researcher
Adeel Malik
University of Oxford

Abstract

Banking concentration, defined as the proportion of total assets owned by either the three or five largest banks in an economy, varies widely across countries. At the high end of the spectrum, we see values above 90% for countries such as Sweden or Myanmar, with values as small as 30% in the United States or India at the lower end. While prior literature has focused on the impact of banking concentration on financial stability or economic growth, we lack a systematic understanding of the determinants of banking concentration across countries. This paper seeks to fill this gap by studying the role of two dimensions, namely political institutions and terms of trade volatility induced by natural resource abundance. Using difference-in-differences analysis and the 2008 Global Financial Crisis as a universal shock, we show growing divergence in bank concentration between the Middle Eastern monarchies and other regime types since 2008. This divergence is more pronounced when we restrict our analysis to an autocracy-only sample. We conclude the paper by offering a political economy explanation for the relatively higher levels of bank concentration in Middle Eastern monarchies.

1 Introduction

Is the difference in the organisation of the financial sector across countries due to deliberate choices made, or is it shaped by fundamental characteristics? The financial sector is a growingly important part of modern economies. It is shaped by the law, economic agents and the state. It evolves not only as a result of domestic action, but also indirectly through global macroeconomic factors such as the exposure to shocks and growing interconnectedness. Two factors that crucially shape the organisation of a country's financial sector are its historically-embedded political institutions (Menaldo, 2015; Rajan and Zingales, 2003) and natural resource endowments (Bhattacharya, 2014; Beck and Poelhekke, 2017). While past studies have examined the role of politics and natural resources in explaining variation in financial sector development across countries, this paper examines their impact on a specific aspect of financial sector organisation: bank asset concentration.

Banking concentration is an important determinant of financial stability and banking sector efficiency. Within a political economy framework, a highly concentrated banking system in countries with weaker institutions allows for more market distortions, a phenomenon known less controversially as directed credit. A state that is heavily reliant on natural resource revenues may want a consolidated financial sector to manage commodity price shocks. We investigate the role of these two determinants across 156 countries from 1997-2015. We find banking concentration levels differ not just by resource wealth, but more specifically by resource-induced volatility. Using dynamic panel data, we establish these relationships across time using a system generalised method of moments (GMM) model. We find that this impact is heterogeneous across regimes and time. We then refocus our paper to capture this heterogeneity through a difference-in-differences regression analysis.

Treating the 2007/8 global financial crisis as a relatively exogenous shock that affected all developing countries, we investigate whether monarchies specifically experienced a differential trajectory of bank concentration relative to other autocracies post-crisis. The global financial crisis can shock the banking system primarily through policy responses – i.e. less integrated financial systems or higher capital requirements. This in turn will affect banking concentration through less foreign involvement or higher entry barriers. This gives an added importance to the institutional

analysis of banking concentration. We show that while other autocracies experienced a dramatic fall in bank concentration in the post-crisis period, monarchies maintained (and increased) their bank concentration. This monarchy effect is robust to a variety of perturbations, including controls for globalisation, terms of trade volatility, and GDP. Interpreting this as a largely Middle Eastern effect, we offer further explanatory evidence on mechanisms. We show that monarchies are more financially open and integrated than their autocratic and oil-rich counterparts. Qualitatively, this is understood in terms of an openness-control trade off, in which monarchies use bank concentration as the natural response to their political objective function.

There is no prior study that offers a nuanced study of cross-country variation in bank concentration. In this regard, to the best of our knowledge this paper offers the first systematic enquiry on the subject.

The paper is structured as follows. Section 2 reviews the related literature; section 3 introduces data and stylised facts; section 4 presents our dynamic panel analysis; section 5 presents the difference-in-difference estimation; section 6 presents our main empirical findings; section 7 presents robustness checks; section 8 discusses potential mechanisms and section 9 concludes.

2 Related Literature

This paper contributes to a gap in the empirical literature on the determinants of banking concentration across time. Existing research has generally focused on the impact of banking concentration on financial sector stability and development, as championed by Demirgüç-Kunt, Ross & Levine (2006) in their seminal paper. Demirgüç-Kunt et al. investigate the impact of banking concentration on a variety of outcomes, including economic development and financial sector efficiency. While one of the first studies in this genre that studies the impact of banking concentration, we are yet to see a study that takes a nuanced look at the *intertemporal determinants* of banking concentration. The scant literature on the determinants of banking concentration is generally limited to modelling the impact of the regulatory environment and macroeconomic indicators (Abdullah, 2006; Hryckiewicz-Gontarczyk and Weirusz-Wrobel, 2015).

The most recent study on the determinants of banking concentration is by Hryckiewicz-Gontarczyk and Weirusz-Wrobel (2015), who focus their study on the impacts of foreign bank involvement in the financial sector. Hryckiewicz-Gontarczyk and Weirusz-Wrobel use the Hirschman-Herfindhal Index as their preferred measure of banking concentration. While this is informative, it is less suited to institutional analysis. This is because the index gives more weight to larger firms, and is thus popular in competition analysis and antitrust law. It is therefore more appropriate for a study of banking sector competition as opposed to concentration. In an institutional framework, concentration matters more insofar as we want to understand state involvement in the financial sector. The study also considers several institutional variables such as property rights and restrictions on entry. This means that the institutional analysis is limited to the regulatory environment, thus overlooking the wider impacts of democracy or financial market integration for example. The study does, however, highlight differences between developed and developing countries. Generally, it demonstrates that more developed economies have less concentrated systems on average. Given its recency, it also sheds insight on trends before and after the financial crisis.

Another study by Evrensel (2008) studies the institutional determinants of banking concentration in a cross-sectional framework, but this analysis is also limited to a narrow set of explanatory variables and countries. We improve on this by studying how politics and volatility affects bank concentration across time. It is useful to also consider studies that investigate the determinants of wider financial sector development. In particular, a paper by Menaldo (2015) studies the institutional impact of financial underdevelopment. Menaldo outlines a theoretical explanation as to how countries with weak institutions manipulate the financial sector to extract rents from the economy. Specifically, Menaldo shows a negative relationship between state capacity and directed credit using dynamic panel data from 130 countries across nearly 20 years.

Another study by Beck and Poelhekke (2017) investigates the natural resource dimension of the financial sector. Using a fixed effects model and financial sector deposits as the dependent variable, they find evidence that resource abundant economies benefit at least as much, if not more, from a well-developed financial system as do resource-poor economies. A more relevant study is by Bhattacharyya (2014),

who looks at the role of both political institutions and natural resource revenues on financial development. Bhattacharyya finds that natural resource revenues are negatively associated with financial development, and that this negative association is exacerbated with weak political institutions. Instead of looking at financial sector development as the outcome variable however, we focus on the intermediate outcome of banking concentration. Furthermore, we develop the institutional analysis mentioned so far. By using a dataset compiled by Barbara Geddes, we disaggregate institutional quality by regime type, allowing us to gain more nuanced insight into how political regimes affect bank concentration.

An important part of our study arises from the intertemporal variation we exploit, which allows us to explore the impact of the 2007 global financial crisis on banking concentration. Several studies have attempted to examine the impacts of the global financial crisis on banking concentration. For example, a paper by the Bank of International Settlements (BIS, 2018) has shown that the financial crisis exacerbated the consolidation process for developed economies prior to the financial crisis. Another paper by Parsons and Nguyen (2016) who found a similar, but accelerated process of consolidation following the global financial crisis for developed economies in particular. The BIS paper also shows that there is cross-country variation in the impact of the GFC on bank concentration, finding a general decrease in banking concentration for emerging economies.

Demirgüç-Kunt et al. (2003) also offer theoretical insight into how systemic crises can affect bank concentration. The study finds evidence that higher levels of banking concentration reduces fragility, where fragility is defined as the probability of undergoing a systemic crisis. In considering the impact of the global financial crisis across regimes, we probe the issue of reverse causality in the literature. By this, we mean that those factors that contribute to fragility may be reacting to the global financial crisis, in turn determining bank concentration.

This paper provides one of the first attempts at probing the deep determinants of bank concentration across countries and over time. Much prior work has focused on broad financial sector outcomes, and where it has focused on bank concentration is primarily considers the role of proximate factors. We consider the role of two structural dimensions: politics and resource-induced volatility. Prior work has also

primarily differentiated between democracies and autocracies (essentially between countries with weak and strong institutions). This paper and its research design however is premised on the idea that there is greater variation in financial sector outcomes among autocracies than between autocracies and democracies. This paper offers the first attempt to draw out this significance in the context of bank concentration.

3 Data and Stylised facts

This section outlines the main data sources used in our empirical analysis.

3.1 Data

Banking concentration

Banking concentration is measured using the percentage of assets owned by the three largest banks in an economy. Based on the data from Bankscope, the variable is made available by the World Bank's Global Financial Development database. We occasionally consider the 5 asset bank ratio, but the underlying data is patchy and less responsive to changes across time. The sample we use for banking concentration analysis is strongly balanced across 156 countries from the years 1997 to 2015.

Political datasets

Our main political dataset comes from Barbara Geddes (2011). Geddes compiles a detailed dataset for regime type classification. We consider five regime types: democracy, monarchy, military, party and personalist. We also use the Polity IV dataset briefly as a robustness check. This is different to the Geddes dataset in that it provides an ordinal scale of institutional quality, ranging from -10 (very autocratic) to +10 (very democratic).

Natural resource wealth and terms of trade volatility

Initially we considered using resource rents as a percentage of GDP to capture resource wealth, but this is sensitive to price changes. Rents might also be endogenous as autocratic states extract resource rents so as to avoid accountability[1]. We instead focus on natural capital per capita. This has the added benefit of exogeneity, and is usually preferred in the literature. Natural capital encompasses variables including fossil fuel energy (i.e. oil and gas) or minerals (i.e. copper and gold). It also

[1]See for example Kolstad and Søreide (2009) or Collier (2011)

includes agricultural land, forests and protected areas. Values are measured at market exchange rates in constant 2014 US dollars, using a country-specific GDP deflator.

Given our focus on natural resource induced volatility, we use an annual measure of terms of trade volatility. The measure is based on high frequency data on commodity terms of trade volatility since 1980. The source of the data is Cavalcanti, Mohaddes, and Raisi (2011).

Controls

We consider a further set of controls such as GDP and population. Furthermore, we consider globalisation, measured through an index on de jure policy by the KOF institute. Another measure of financial freedom is used as compiled by the Heritage Foundation. We also use a bank crisis dummy variable, coded as 1 if a country undergoes a systemic crisis in a given year. A detailed description of these variables are available in item 2 of the appendix.

3.2 Descriptive statistics

We begin by introducing two main hypotheses. Firstly, we argue that resource-induced volatility drives changes in banking concentration. The link between resource wealth and volatility is easy to assert, so we accept this without question. Secondly, we argue that this relationship is particularly prevalent in non-democracies. To motivate, we present illustrative cross sectional results on a sample of autocracies only.

Table 1: *Initial cross-sectional results*

VARIABLES	3-asset bank concentration	5-asset bank concentration
Terms of Trade Volatility	2.788***	2.226***
	(1.222)	(1.004)
Observations	52	52
R-squared	0.156	0.180

The above controls for GDP, population and natural resource wealth. We find insignificance on natural resource wealth, but high significance for terms of trade volatility. This significance does not hold in an all-country sample. This raises several questions – why is terms of trade volatility significant in the autocracy sample? What is it about autocracies that means they have to, or are able to, consolidate the

financial sector in the face of volatility? To understand how this works in a dynamic setting, we employ a dynamic panel model.

4 Dynamic Panel Analysis

4.1 Identification

Our preferred empirical model uses the system GMM estimator, owing mainly to persistence in the dependent variable and the dynamic context in which we hope to understand banking concentration. To understand the impact of terms of trade volatility over time, we estimate the following specification:

$$BC_{i,t} = \beta_1(TOTV_{i,t-1}) + \beta_2(BC_{i,t-1}) + \beta'(x_{i,t}) + \alpha_i + \epsilon_{i,t} \quad (1)$$

where BC_{it} measures the proportion of assets owned by the three largest banks for country i at time t. $TOTV_{it}$ measures terms of trade volatility and β_1 identifies our main parameter of interest. We include the lagged value of both terms of trade volatility and banking concentration. We lag the value of terms of trade volatility as we suspect there will be some delay in the effect that terms of trade volatility has on banking concentration. We also control for the lagged dependent variable and a set of additional control variables in the vector x_{it}. The country fixed effects parameter α_i controls for time-invariant country-specific characteristics such as geography or legal origins. ϵ_{it} is the contemporaneous error term for country i at time t.

Our choice of additional explanatory variables is guided by theory and empirics. Firstly, we control for the natural log of GDP per capita. We expect the size of the economy to be a crucial determinant of banking concentration. We include for year fixed effects to control for period-specific shocks that affect all countries. We include further controls in our robustness section.

This paper seeks to understand how the effect of terms of trade volatility varies with institutions. The difficulty with studying how political institutions affect banking concentration over time is the rigidity of political regimes. Only a handful of countries undergo regime changes throughout our sample period, owing to the fact that our sample period starts well after the third wave of democracy throughout the 1980s. For this reason, we estimate a further specification that interacts terms of trade

volatility with a measure of political institutions:

$$BC_{i,t} = \gamma_1(TOTV_{i,t-1}) + \gamma_2(ND_i \times TOTV_{i,t-1}) + \beta_2(BC_{i,t-1}) + \beta'(x_{i,t}) + \alpha_i + \epsilon_{i,t} \quad (2)$$

where here ND_{it} is a binary measure of democracy as measured by the Geddes dataset. It follows that our base category is democracy, defined using the same dataset.

To frame the issues for identification, we first justify controlling for the lagged dependent variable. Substantively, we know that banking concentration can be persistent. Controlling for this avoids capturing feedback, instead estimating the impact of the explanatory variables. To test this, we use the augmented Dickey-Fuller test of stationarity, with results presented in item 1 of the appendix. The null hypothesis of the Dickey-Fuller test is that our dependent variable has a unit root, with the alternative of stationarity. We find evidence of stationarity, and thus include the lagged dependent variable in our model.

Controlling for the lagged dependent variable holds a lot of information constant. The reciprocal gain is that it allows us to understand how our explanatory variables affect banking concentration in a dynamic context. We also recognise the statistical trade-offs of this – namely, smaller coefficients and higher standard errors. Upon generating our results, this gives us added confidence that we are capturing meaningful relationships in our model. We now provide a brief justification as to why the system GMM estimator as prescribed by Blundell and Bond (1999) is our preferred approach.

Consider first the endogeneity that arises from the unobserved fixed effects parameter, α_i. To correct for this we would take first differences of the model, but this would bias our estimates downwards through the endogeneity implied by the correlation between the $BC_{i,t-1}$ in $BC_{i,t-1} - BC_{i,t-2}$ and the $\epsilon_{i,t-1}$ term in $\epsilon_{it} - \epsilon_{i,t-1}$. This is a phenomenon known as the Nickell bias (1981). Given that our sample is of $T = 20$, the Nickell bias is not trivial. The difference GMM (Arellano and Bond, 1991) deals with this by using lagged values of variables as instruments for the differenced equation. This does not correct for the persistence of our dependent variable however, which renders lagged levels of persistent variables as weak instruments for the differenced equation.

The system GMM estimator improves upon the difference GMM by using a system of a regression in levels and a regression in differences. This means that we include lagged levels of the dependent variable as well as differences in our regression. For this estimator to work, we impose assumptions that grant us moment conditions to exploit in the data. Firstly, we assume sequential exogeneity in the error term.

$$\text{Assumption 1:} \quad E[\epsilon_{i,t}|BC_{i,t_0}, ..., BC_{i,t-1}, x_{i,t}, x_{it_0}, \alpha_i] = 0 \quad \text{for all} \quad t \geq t_0 \tag{3}$$

This requires that past levels of banking concentration and our other explanatory variables are orthogonal to contemporaneous and future error values.

Given the empirical literature, however, we might argue that lower levels of banking concentration leave certain economies more vulnerable to crises, which may in turn alter future levels of banking concentration. We mitigate this by controlling for crisis dummy variables as a robustness exercise. More importantly, however, the general convergence in banking concentration for most economies, despite high variation in banking concentration levels at the start of our sample period, suggests this assumption could plausibly hold. We also require that the error term is serially uncorrelated, which we can test for by varying lag restrictions. This rids the model of residual serial correlation, and is reflected in our AR(1) tests reported with each regression.

Assumption 1 then implies the following moment conditions:

$$E[(\Delta\epsilon_{i,t})(BC_{i,t-s}, x_{i,t-s})'] = 0 \tag{4}$$

for all $2 \leq t; 2 \leq s$.

These are necessary for the differenced GMM estimator, but not sufficient for the system GMM. Specifically, the above moment conditions do not address the persistence of the dependent variable To overcome the problem of persistent dependent variables as is present in the differenced-GMM estimator, we want to be able to use the lagged differences of the explanatory variables as instruments in the equation in levels. The validity of these instruments rests on *constant* correlation between our explanatory variables and the country fixed effect, α_i:

$$\text{Assumption 2:} \quad E[x_{i,t-1}\alpha_i] \neq 0 \tag{5}$$

This says that our explanatory variables are correlated with country-specific fixed effects. Consider our main explanatory variable of interest, terms of trade volatility. Insofar as we recognise that terms of trade volatility is induced by natural resource abundance, this could indeed be correlated with country fixed effects. For example, countries with greater oil reserves are going to be more resource-rich, and in turn experience more volatility. This means the first differences of the explanatory variable is orthogonal to future shocks:

$$E[(\Delta x_{i,t-1})(\alpha_i)] = 0 \tag{6}$$

Blundell and Bond (1998) show that these additional moment conditions can provide dramatic gains in efficiency provided that the additional initial condition (5) is valid.

Thus far, these assumptions have allowed us to exploit additional moment conditions, primarily ameliorating the concerns of persistence in the dependent variable. In turn, this has allowed us to make strong efficiency gains. However, given that we are using lagged values for those explanatory variables we suspect to be endogenous, the number of instruments used will increase exponentially with the number of time periods we have. Recall that we use volatility as a proxy for a more accurate impact of natural resource abundance, we use the lagged value as instruments to effectively treat the variable as endogenous. At $T = 18$, we risk overfitting the model. This leads to finite sample bias due to the overfitting of endogenous variables, increasing the likelihood of downwardly biased estimates. To ameliorate these concerns, we follow Roodman's (2007) methodology and present results with a collapsed instrument set. This simply amends (4) for all s $\geq$ 2.

4.2 Preliminary results

Table 2 presents our main results for our baseline specification. In all columns, the dependent variable is the 3-bank asset concentration ratio. Columns 1 and 2 use a sample of all countries, while columns 3 and 4 restricts our analysis to developing countries only. We initially split the data based on income to account for potential heterogeneity in the impact of terms of trade volatility. We add the non-democracy interaction term in columns 2 and 4.

Our main parameter of interest, the interaction term, is statistically significant in columns 2 and 4. In column 2 we find a positive, statistically significant coefficient on the non-democratic interaction term with terms of trade volatility. In column 4, this coefficient dramatically increases, albeit with less statistical significance. The decrease in statistical significance could

be driven by a smaller sample size, noting the difference in both the number of countries and observations. However, the observed differences when restricting to developing countries leads us to believe that there is heterogeneity both in how terms of trade volatility and political institutions affect banking concentration. Of further interest is that the coefficients on terms of trade volatility are almost polar opposites. An increase in terms of trade volatility decreases banking concentration in democracies, but increases bank concentration in non-democracies.

The lagged dependent variable is positive and statistically significant across all columns, indicating that banking concentration generally increases between each year. The lagged length is empirically defined in the sense that only one lag is significant, and thus including for additional lags is uninformative. The natural log of GDP in the previous period is positive and statistically significant in the first two columns only. The positive coefficient here might reflect increased activity in the financial sector, for example more mergers and acquisitions or greater presence of large global banks. The insignificance of GDP per capita in columns 3 and 4 suggest that perhaps changes in GDP are not as instantaneously reflected in banking concentration across developing countries.

Table 2: *Baseline results – terms of trade volatility and banking concentration*

	All countries		Developing countries	
VARIABLES	(1)	(2)	(3)	(4)
	Dependent variable: 3-bank asset concentration			
$BC_{i,t-1}$	0.862***	0.797***	0.844***	0.987***
	(0.061)	(0.068)	(0.147)	(0.073)
$ln(GDP)_{t-1}$	1.380*	1.440**	1.092	1.312
	(0.765)	(0.722)	(3.048)	(2.113)
TOT_{t-1}	-0.283	-0.489***	0.479	-0.408
	(0.249)	(0.184)	(0.607)	(0.438)
$ND*TOT_{t-1}$		0.474**		1.071*
		(0.183)		(0.580)
Year fixed effects	YES	YES	YES	YES
Observations	2,136	2,136	661	661
Number of countries	140	140	53	53
AR(1) test (p-value)	0.000	0.000	0.004	0.002
AR(2) test (p-value)	0.402	0.401	0.633	0.78
Robust standard errors in parentheses				
*** p < 0.01, ** p < 0.05, * p < 0.1				

[a]The null hypothesis of the test is that the instruments as a group are exogenous. *p-value* is robust to heteroskedasticity and autocorrelation.

The *p-values* of the Arellano and Bond AR(1) and AR(2) tests are also presented here. To pass these tests, one has to reject the null of no AR(1) and fail to reject the null of no AR(2).

The models pass the Arellano-Bond test for autocorrelation of the errors, with the null hypothesis of no autocorrelation in differenced errors. We also fail to reject the null of no second-order correlation, inspiring added confidence in our results. All our dynamic models additionally pass the Hansen test of overidentifying restrictions.

Our results hold when using different definitions of non-autocracy. This is enabled through the Polity IV dataset, which ranks countries on a scale from -10 (very autocratic) to +10 (very democratic). When we vary the cut-off point used to define non-democracy, the coefficient on the main parameter of interest (the interaction term) is 0.605 and 0.597 when we use a threshold of 0 and 5 respectively, with statistical significance at the 5% level for both terms. Our core empirical result therefore holds when we use different definitions of non-democracy. Our results also hold when we control for crisis dummy variables and globalisation. We see less significance when controlling for financial freedom, but suspect this is in part due to collinearity with regime status. We do not present these results, focusing instead on probing further the intertemporal variation in terms of trade volatility.

4.3 Volatility over time

Plotting volatility across time and stratifying by regime type, we suspect the impact on banking concentration is nonlinear. To see this, consider figure 1 below:

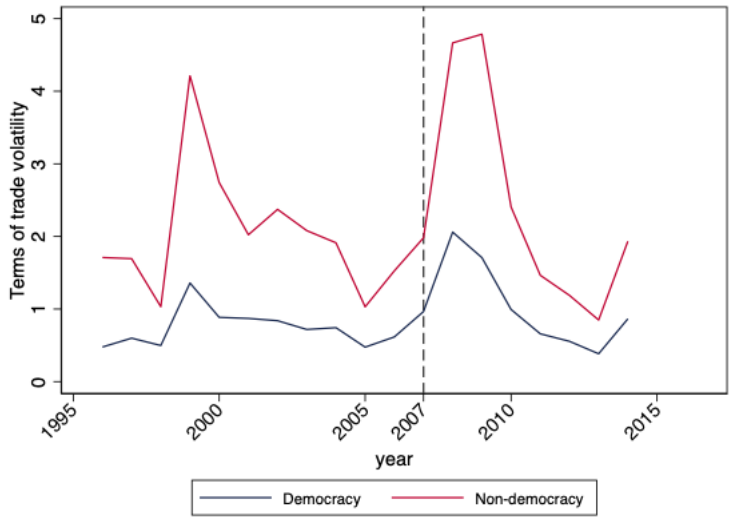

Figure 1: Volatility across time

Terms of trade volatility is much higher for non-democracies. Furthermore, we see a significant rise after 2007, around the time of the GFC. To unpack this, we split the data for both pre and

post-2008 periods. The specific cut-off point for a pre-2008 sample includes 2007 as its latest value. As a further experiment, we use an extended sample that dates back to 1988 as used by Demirgüç-Kunt et al. (2003). We use this to study more closely whether the non-democracy and terms of trade volatility is more prominent in particular time periods.

Table 4 presents our results. We interpret with caution those results in the third column that use the extended sample set. The dataset is only intended as a robustness exercise because the dataset is heavily caveated. It is not constructed using Bankscope, our preferred data source on banking concentration. The results also hold if we relax the cut-off point, i.e. when we include for 2008 in the pre-2008 sample (and exclude it in the post). We do not split the data below by income owing to data constraints before 2008. This does not pose a problem as we instead focus on exploring heterogeneity in two main dimensions: regime type and time. The interaction

Table 3: *Exploring heterogeneity across time*

VARIABLES	(1) Pre-2008	(2) (Post-2008)	(3) (1988-2015)
$BC_{i,t-1}$	0.745***	0.824***	0.952***
	(0.095)	(0.098)	(0.039)
$ln(GDP)_{t-1}$	0.582	1.486	-0.558
	(0.765)	(0.904)	(0.779)
$TOT_{i,t-1}$	0.323	-0.463*	-0.563
	(0.558)	(0.235)	(0.729)
$ND*TOT_{i,t-1}$	-0.095	0.578*	0.570**
	(0.686)	(0.325)	(0.285)
Observations	1,216	869	2,531
Number of countries	128	135	140
AR(1) test (p-value)	0.000	0.000	0.000
AR(2) test (p-value)	0.971	0.633	0.952
Robust standard errors in parentheses *** p < 0.01, ** p < 0.05, * p < 0.1			

term is insignificant before 2008 (column 1), and significant afterwards (column 2). This tells us that the impacts of non-democracy and terms of trade volatility are more significant after the global financial crisis. Note that both terms of trade volatility coefficients are significant in the post-crisis period, telling us volatility itself became more salient following the crisis. It is further telling that these coefficients (that of volatility and its non-democratic interaction) are at their most divergent in this specification. Therefore, we are seeing heterogeneity not just across time but across regime as well. In column 3 we see consistency in our results, providing added confidence that this relationship holds over time. The negative coefficient on the natural log of GDP might raise some additional questions, but given its statistical insignificance we omit discussion of it here. Our results pass the required specification tests, giving us confidence that

we have not overfitted the data.

Thus far, we have demonstrated the nonlinear impact of terms of trade volatility on banking concentration. In particular, this effect is heterogeneous across two dimensions: regime type and time. We identify the global financial crisis as a potential source of this nonlinearity, but we are yet to identify specifically how regime type distorts the impact of volatility. To do this, we stratify further by regime type using the Geddes dataset, and re-plot figure 1 below.

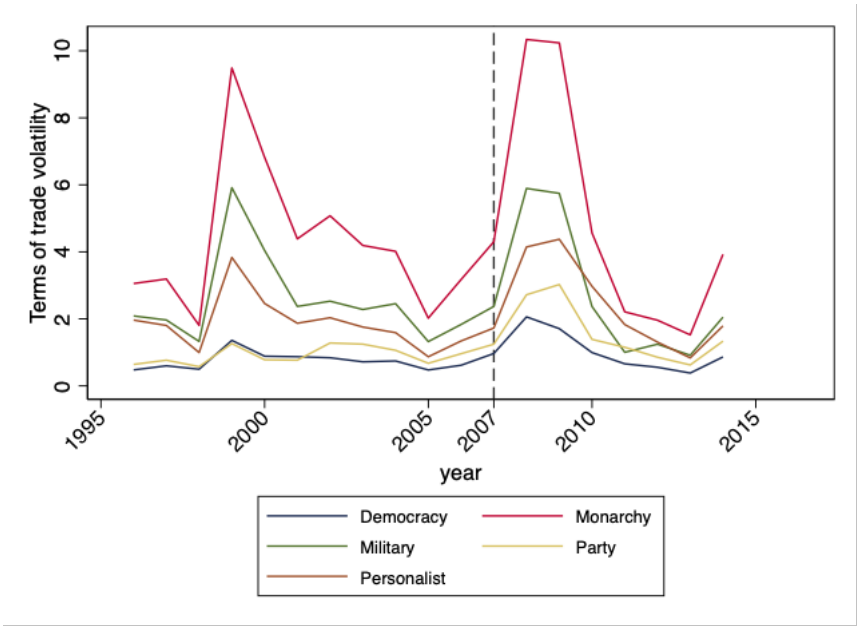

Figure 2: Volatility across time, stratified by regime type

The volatility is overwhelmingly driven by monarchies. As per the results above, this suggests that monarchies, given their non-democratic status, would have seen much higher increases in the levels of banking concentration following the global financial crisis and subsequent increase in terms of trade volatility. Using the dynamic panel, we have captured the significance of terms of trade volatility in determining banking concentration across time. We have also observed nonlinearity in the impact of terms of trade volatility.

Term of trade volatility increases for all regime types following the global financial crisis, but as we will see there is a specific divergence in banking concentration between regimes immediately after 2007. This divergence motivates the following sections, requiring us to refocus our research method. To capture this heterogeneity, we use a difference-in-difference regression. In this we use the global financial crisis in a treatment-control framework, and owing to the plot above we employ monarchies as the treatment group.

5 Monarchies and the global financial crisis

Thus far, we have seen that the impact of terms of trade volatility varies not just by regime type, but also by time period. We want to explore this heterogeneity further. To do this, we set out a difference-in-difference specification. In particular, we use this specification to examine the impact of monarchies on banking concentration following the GFC.

In order to set up the GFC in our treatment-control framework, we require it to be an exogenous shock. The GFC was an exogenous shock from the perspective of only a subsample of countries, however. Therefore, we initially drop G7 countries from our sample before moving on to our preferred specification that considers autocratic countries only. To help motivate this, figure 3 presents banking concentration trends across time and the three regime types of interest: democracy, monarchy and non-monarchy autocracy. For reasons explained below, this plot excludes Nepal.

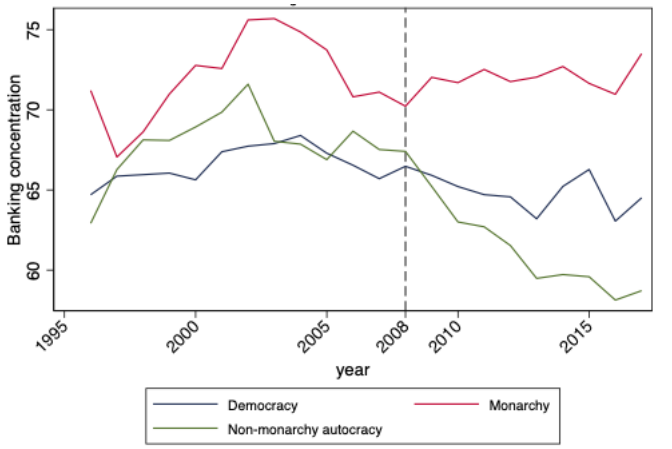

Figure 3: Bank concentration across time

This divergence continues to hold when we plot the residuals from a regression of bank concentration on the log of GDP per capita and terms of trade volatility (see figure(a) in the appendix). This tells us that there is something beyond terms of trade volatility and income that is impacting banking concentration following 2008.

To investigate this more systematically, we estimate the following specification:

$$BC_{i,t} = \delta_{POST} + monarchy + \beta_1(monarchy \times \delta_{POST}) + \gamma(\mathbf{x}'_{it}) + \alpha_i + \eta_t + \epsilon_{it} \qquad (7)$$

where as before, $BC_{i,t}$ is the level of banking concentration in country i at time t.

$(monarchy_i) \times \delta_{POST}$ is the interaction between a dummy variable for monarchies and an indicator variables coded as 1 for all post-crisis years (2009 onwards). We then have a vector of characteristics we might want to control for contained in $\gamma(\mathbf{x}'_{it})$. We include annual year fixed effects captured in η_t. This accounts for all shocks that affect the whole sample in a given year. To control for time-invariant differences across countries, we include country-specific fixed effects α_i. Standard errors are clustered by country. Our coefficient of interest is β_1. It captures the observed change in banking concentration following the 2008 financial crisis, provided that a country is a monarchy.

We want our core explanatory category to remain constant across the sample period. All monarchies in our sample have remained stable monarchies since the 1950s, apart from Nepal which underwent a regime change in 2006. This is reflected (indirectly or directly) in banking concentration levels as presented in figure (b) of the appendix. For a consistent and more accurate depiction of how monarchy status affects the post-2008 trend of banking concentration, we exclude Nepal from our sample.

Our identification strategy relies on the exogeneity of the interaction effect $(monarchy_i) \times \delta_{POST}$. To ensure this, we consider two potential threats to this assumption. Firstly, if banking concentration was trending differently in monarchies from other political regimes, then we might not be capturing the effect of the interaction term. Secondly, we also want to assume independence of the assignment to treatment (monarchy status) on potential outcomes (banking concentration).

For the first concern, we estimate a fully flexible specification to investigate whether monarchies were trending differently in terms of their banking concentration relative to non-monarchies prior to the 2008 financial crisis. The specification is given below:

$$BC_{i,t} = \phi(monarchy_i \times \eta_t) + \gamma(\mathbf{x}'_{it}) + \delta_i + \eta_i + \epsilon_{it} \tag{8}$$

where variables are defined as previously, with the notable addition of $(monarchy_i \times \eta_t)$. Our parameter of interest is now in ϕ_1, which describes the relationship between monarchies and banking concentration in each year of our sample. If the coefficients on these values are relatively constant over time and statistically insignificant for the years preceding the 2008 financial crisis, then this provides evidence for the absence of differential trends between monarchies and non-monarchies before 2008. Similarly, if, as we hypothesise, monarchies have higher levels of banking concentration following the 2008 financial crisis then we would expect these coefficients

to become (more) positive and statistically significant as the effects of the crisis are realised post-2008. We estimate the flexible specification on our preferred specification of an autocracy only sample. Our result holds when we estimate this on an all regime sample. We control for some of the crucial determinants of bank concentration, viz. GDP and terms of trade volatility.

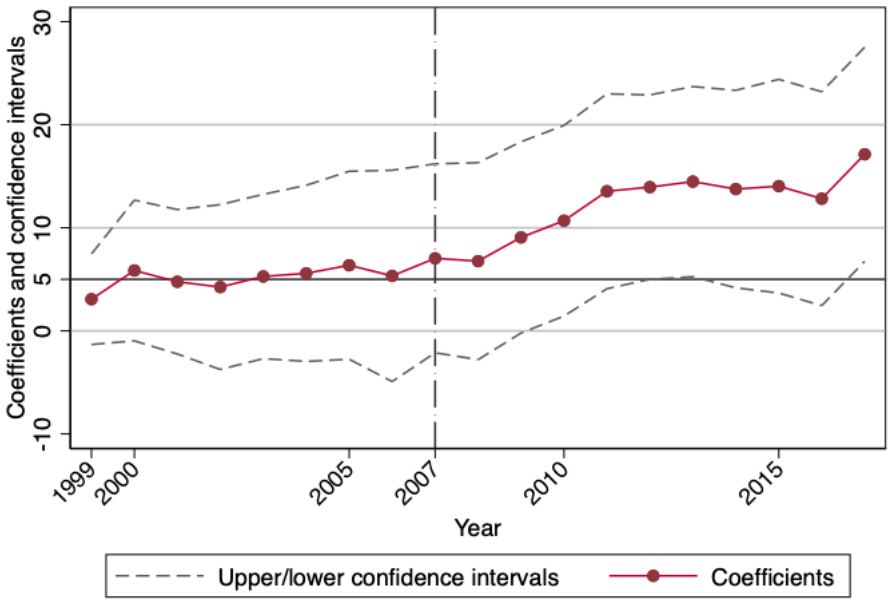

Figure 4: Flexible specification plot

Figure 4 plots the coefficients of the interaction term in (2). There are no statistically significant differences in banking concentration between monarchy and non-monarchies prior to 2007. Coefficients prior to 2007 are insignificantly nonzero, and only become significantly positive following the GFC. This gives us added confidence that monarchies were not trending differently prior to the GFC. This ultimately provides strong evidence against our first concern regarding the exogeneity of our interaction term.

Secondly, we want to assess the independence of the assignment to treatment and potential outcomes. Our treatment status is stable across the sample period, and we have confidence that this is predetermined with respect to the dependent variable. It is this endogeneity concern that motivates us to remove Nepal from our sample. It is still possible, however, that the interactive effect of monarchies is proxying for other dimensions omitted from our analysis. We therefore control for a vector of characteristics in order to isolate the impact of monarchy status on post-2008 trends in banking concentration. These include financial openness, financial sector development indicators and initial levels of banking concentration.

6 The differential effect of monarchies

Table 5 presents our results. In the first three columns, our base category is all non-monarchical regime types, including democracies. In the final three, we restrict to an autocracy only sample. This has the advantage that our control group (autocracies) will be more similar to the treatment group (monarchies) along more dimensions. For consistency, we also replicate this specification using other non-democratic regimes in table (a) of the appendix. In each column we successively add for our two main control variables; the natural log of GDP per capita and terms of trade volatility. Each regression controls for country and year fixed effects, with robust standard errors clustered at the country level.

Our main parameter of interest, the interaction term, has statistical significance on a positive coefficient in all specifications. It retains significance when controlling for GDP, albeit with a smaller coefficient. This suggests that less developed monarchies increased banking concentration less than their wealthier counterparts following the GFC.

Table 4: *Monarchies and non-monarchies responding to the Global Financial Crisis*

	All regimes		Autocratic regimes	
VARIABLES	(1)	(2)	(3)	(4)
	Dependent variable: 3-bank asset concentration			
δ_{POST}	-7.550***	2.245	-14.48***	-5.058
	(2.120)	(2.879)	(3.644)	(3.882)
$monarchy_i \times \delta_{POST}$	7.187**	5.150**	11.52***	8.656***
	(2.988)	(2.541)	(3.384)	(2.984)
$ln(GDP)_{i,t}$		-9.637***		-9.031***
		(2.123)		(2.672)
Observations	2,625	2,591	1,165	1,143
R-squared	0.101	0.148	0.214	0.268
Number of countries	140	140	53	53
Robust standard errors in parentheses				
*** p < 0.01, ** p < 0.05, * p < 0.1				

When comparing column 1 and 4, the size of the interaction coefficient almost doubles in size. This suggests a stronger divergence between monarchies and non-monarchy autocracies, than that of monarchies and non-monarchies generally. This could be due to the large aggregation of democratic countries which shows greater variation in banking concentration levels, but it also accurately reflects the sharp drop in banking concentration for non-monarchy autocracies following the GFC. This is evidenced in the negative post dummy variable in columns 4-6, despite losing significance when controlling for GDP. The GDP coefficient however is negative and statistically significant in all specifications, reinforcing that more developed non-monarchies have lower banking concentration on average.

Our results show two main takeaways. Firstly, monarchies increased banking concentration more than other regimes following the GFC. Secondly, this divergence is more pronounced when we restrict our control group to non-monarchy autocracies. In the following section we explore the robustness of this empirical finding.

7 Robustness

To demonstrate the robustness of our result, we investigate whether the interactive effect of monarchy stands up to a host of competing explanations. This is broadly split into two strands. Firstly, we explore the role of financial sector development in determining bank concentration. We know that countries differ markedly in the sophistication of their financial systems, and this can determine the number of banks that can operate in countries. As part of this analysis, we consider a wider set of controls that are relevant to our study. A detailed description of the variables used for the robustness exercise are described in the Appendix. Secondly, we scrutinise the typology of monarchies in our assessment. We argue that there is something fundamentally special about *monarchies*, and we seek to isolate this from competing characteristics that might be entrenched in monarchical regimes. In particular, we consider the role of oil. Higher bank concentration might be necessary to absorb shocks that materialise through price changes that commodity-dependent economies may be vulnerable to. Since the bulk of our monarchies are oil-dependent, we want to discern between the oil-dependence and monarchy status effect in driving the divergence in bank concentration between monarchies and non-monarchies.

7.1 Financial sector development

Firstly, we account for terms of trade volatility which, as dynamic panel estimates suggest, can affect banking concentration. Secondly, we account for the occurrence of bank crises that can trigger wider consolidation of the banking sector, thereby resulting in higher concentration. We also want to interact some measure of initial banking concentration with the 'post' dummy to capture the persistence of the dependent variable.

We also include several measures of financial sector development. We consider liquid liabilities, private credit and non-performing loans. We expect a negative relationship between bank concentration and both liquid liabilities and private credit. Greater market activity means more market players, and this is reflected in lower banking concentration. Non-performing loans are expected to negatively impact bank concentration. A greater share of non-performing loans will make the financial system less attractive for banks, thus raising concentration. After accounting

for financial sector development, we then add two further controls related to globalisation and economic freedom.

Table 5: *Controlling for financial sector development*

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: 3-bank asset concentration						
δ_{POST}	-1.331	-3.142	19.841***	23.93***	22.00***	26.47***	13.01
	(5.107)	(4.857)	(4.749)	(5.650)	(4.909)	(7.487)	(10.34)
$monarchy_i \times \delta_{POST}$	7.638**	8.003***	9.05***	9.071***	10.76***	11.74***	11.89***
	(2.891)	(2.921)	(2.473)	(2.435)	(3.066)	(3.236)	(3.505)
$ln(GDP)_i, t$	-8.491*	-7.381**	-8.432***	-8.478***	-7.008**	-5.640	-1.675
	(3.642)	(3.546)	(2.980)	(3.087)	(2.788)	(4.458)	(5.868)
$TOT_{i,t}$	-0.0508	-0.0211	0.00242	0.00780	0.129	0.134	0.265
	(0.153)	(0.145)	(0.164)	(0.163)	(0.167)	(0.216)	(0.243)
Bank crisis dummy		-1.450	-1.099	-0.491	2.154	-0.376	5.402*
		(4.333)	(3.483)	(3.446)	(2.671)	(3.728)	(3.152)
$BC_{i,t=2000} \times \delta_{POST}$			-0.325***	-0.342***	-0.329***	-0.395***	-0.277**
			(0.0874)	(0.0890)	(0.0842)	(0.105)	(0.107)
Liquid liabilities				-0.0959	0.0185	-0.0111	0.0745
				(0.0818)	(0.0492)	(0.0305)	(0.0839)
Private credit					-0.249**	-0.196	-0.0929
					(0.104)	(0.119)	(0.165)
Non-performing loans						0.353*	0.119
						(0.206)	(0.155)
Financial Freedom							-0.0743
							(0.273)
KOF index							-0.130
							(0.0907)
Observations	883	852	852	678	678	479	335
R-squared	0.208	0.208	0.208	0.299	0.329	0.314	0.326
Number of countries	60	60	60	41	41	37	27
Robust standard errors in parentheses							
*** p < 0.01, ** p < 0.05, * p < 0.1							

Table 6 shows that our monarchy result holds up to all of the above controls. As the Table shows, the interaction between initial bank concentration measured in 2005 with the Post dummy variable turns up as negative and statistically significant. This suggests that countries with higher initial bank concentration experience slower increase in bank concentration post-2008. In columns 3-6 we also see some significance in our financial sector variables. In particular, the coefficients on private credit and non-performing loans turn up with expected signs. Overall, we find that the coefficient on the monarchy interaction actually increases in size with the successive addition of controls. We interpret this with caution as the sample size drops with new controls, which is symptomatic of data constraints. Overall, these results are reassuring. The differential impact of monarchy on bank concentration post-2008 remains quite robust.

What might be surprising is the insignificance of terms of trade volatility given our results from the dynamic panel model. The results suggest that monarchy status may be a better predictor of terms of trade volatility. This leads us nicely into our analysis of the role of oil, where we consider whether our analysis is picking up oil-dependence or the monarchy effect.

7.2 The role of oil

Note that in our sample, over half of monarchies are oil rich. Specifically, of the 8 monarchies we consider in our analysis (sans Nepal), six are oil-dependent and all members of the Gulf Cooperation Council (GCC). The remaining two are Morocco and Jordan. The latter is also heavily dependent on GCC countries for remittances. The point to make here is that we have an overwhelming majority of monarchical regimes that are dependent on oil, and so it is important to isolate the monarchy effect in the face of this. All countries, however, regardless of regime type, experience an increase in terms of trade volatility after 2007. We know that monarchies witnessed the biggest increase in volatility. But our question of interest is whether subsequent increase in banking concentration a result of these countries being monarchical or being oil rich.

To consider this, we disaggregate our autocratic sample using three categories: monarchy, oil rich and oil poor. We recognise these categories are not mutually exclusive. But to capture the monarchy effect any country listed as a monarchy is included in the first category regardless of oil wealth. If monarchies move in a different direction to oil-rich non-monarchies, we have confidence that there is indeed a monarchy effect, rather than an oil effect. We plot oil rich banking concentration after regressing banking concentration on GDP in figure 5 below. We divide non-monarchies into two groups: oil-rich and oil-poor.

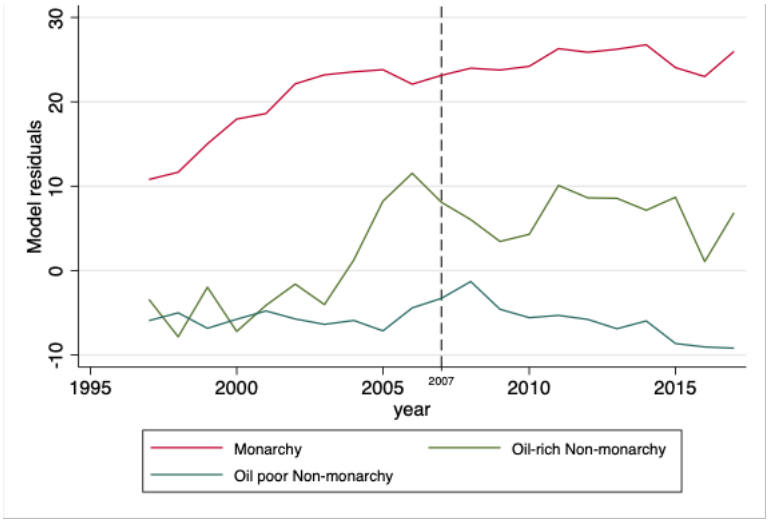

Figure 5: Bank concentration by oil wealth

We can see that monarchies in general have higher levels of banking concentration. Following the GFC, there is a further divergence. This is largely driven by party regimes (who are typically non-oil rich) as is evidenced in table (b) of the Appendix. Figure 5 therefore presents a clear pattern: the divergence between monarchies and other regimes persists when we stratify non-monarchies by oil wealth. This is not, however, to negate any oil-rich effect. The oil effect can be seen in the generally higher levels of bank concentration. This might be explained by way of terms of trade volatility. Specifically, volatility in oil revenues will necessarily mean central banks and financial institutions become more conservative in their outlook, and demand banks to maintain excess liquidity to ensure greater financial stability in the face of external shocks (Beck and Poelhekke, 2017; Malik, 2016). This in turn will impact concentration through higher entry barriers, in some cases deterring entry through high capital requirements and a wider range of compliance procedures (Malik, 2016). Figure 5 however shows there is a greater monarchy effect at work.

We therefore re-estimate our specification, using a binary indicator of oil-wealth. Firstly, we consider a cut-off of 10% oil rents as a percentage of GDP to define 'oil rich'. This means that any country that earns more than 10% of GDP from oil-based market activity will be considered 'oil-rich'. This gives us a diverse pool of regimes. For example, we consider democracies like Norway or Monaco, as well as non-monarchical autocracies like Nigeria or Angola. We then consider whether this effect is more pronounced when using a higher cut-off (30%). It is worth mentioning that using a higher cut-off makes our analysis considerably more monarchy-heavy, but this provides added explanatory benefit when including the monarchy indicator in our specification (i.e. amongst monarchies themselves, we can better understand weather the monarchy-effect or oil rich-effect dominates).

All the below models control for GDP in a similar way to previous estimates. The first column re-estimates our specification on a sample of all countries using the oil-rich indicator. We then include monarchy status in column 2. Columns 3-5 concern autocratic regimes only, and repeat the first two columns based on this narrower sample. Column 5 however uses a higher cut-off for oil-wealth at 30%.

Table 6: *The role of oil in the Monarchy response*

	All regimes			Autocratic regimes	
VARIABLES	(1)	(2)	(3)	(4)	(5)
	Dependent variable: 3-bank asset concentration				
δ_{POST}	5.632**	5.77**	0.346	-1.311	-0.55
	(2.255)	(2.259)	(3.548)	(3.575)	(3.386)
$oilrich_i \times \delta_{POST}$	3.807**	4.298	6.28**	4.18	1.55
	(2.068)	(2.714)	(2.84)	(3.047)	(2.574)
$monarchy_i \times \delta_{POST}$		-1.694		6.614*	8.37**
		(4.518)		(3.377)	(3.227)
Observations	2,609	2,609	961	961	867
R-squared	0.148	0.148	0.296	0.306	0.301
Number of countries	153	153	67	67	67

Robust standard errors in parentheses
*** p < 0.01, ** p < 0.05, * p < 0.1

The above has several interesting takeaways. Firstly, consider that in comparison to table 5, the monarchy effect is stronger than the oil-rich effect. We can see that the monarchy effect is greater with a coefficient of 7.187, in comparison to the oil-rich effect at 3.807. This is similarly reflected in the autocracy only sample, comparing the oil-rich coefficient of 6.28 in column 3 to the monarchy status coefficient of 11.52 in table 5. In both samples, monarchy status has a greater statistical effect on bank concentration.

Secondly, when including both the monarchy and oil-rich effect, monarchy status has more significance and a larger coefficient. The monarchy effect is also prevalent when using a higher cut-off for oil wealth as in column 5, as we see the monarchy coefficient increase in both size and significance, from 6.614 to 8.37. The monarchy effect is indeed significant, and becomes more so when we consider those countries with higher levels of oil wealth. This confirms that while there is an oil-rich effect in determining bank concentration worth considering, there is something fundamental about the impact that monarchy status has on bank concentration. As mentioned above, the mechanism behind the oil-effect is established - the reliance on commodities breeds a need to have resilient financial systems, which consequently means strong (and therefore fewer) banks survive these climates. We accept this without question, and choose to explore the role of monarchical regimes and the mechanisms through which they determine bank concentration.

8 Mechanisms

In this section we explore several mechanisms through which the monarchy effect could be working. We want to know what institutional levers monarchical regimes have that determine bank concentration in such a way, as well as considering why this materialises in monarchies especially. We consider globalisation and financial freedom, as well as state and foreign ownership of banking assets. We consider these mechanisms as variables because these are issues that the state has considerable influence over.

To motivate further, we firstly plot four graphs of these variables. We then explore the monarchy effect by replicating our preferred specification using each mechanism as the dependent variable. If we see a significant effect on the interaction term, this gives us reason to believe that these might serve as potential channels through which banking concentration is being influenced. Given data constraints, some of these ideas are clearly speculative and intended as prompts for further exploration. We have made note of this where appropriate.

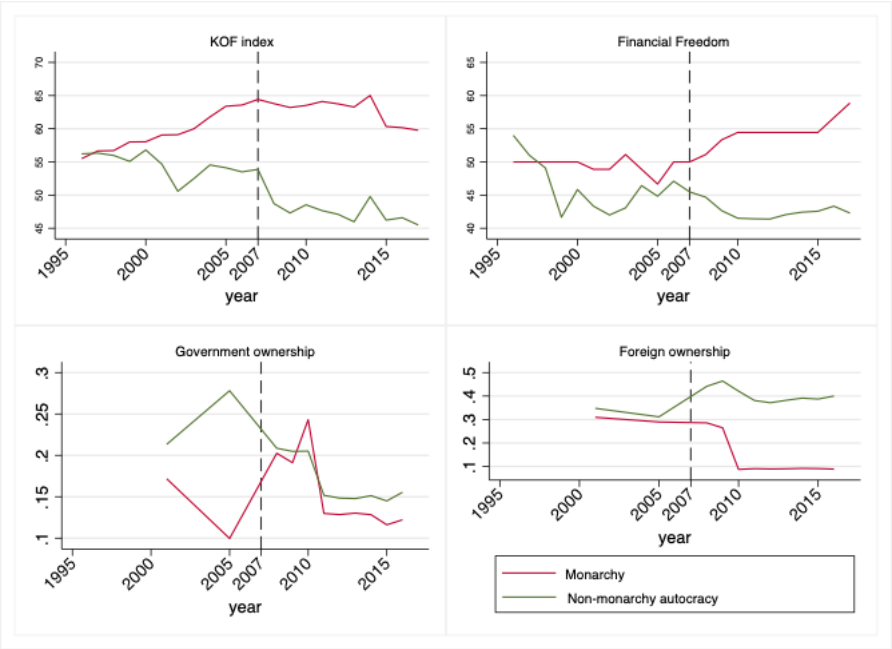

Figure 6: Divergence in four dimensions

Figure 6 plots these trends across time for monarchies and non-monarchy autocracies. There is divergence in the first two quadrants for non-monarchy autocracies: they are less globally integrated and have less financial freedom. The divergence in globalisation, however, started long before the GFC but it became more pronounced after the crisis. Interestingly, we see a convergence in state ownership of banks. Noticeably, two dimensions where we can observe a clear pattern of divergence post-crisis are: foreign ownership of banks and financial freedom.

Interestingly, monarchies witnessed a dramatic reduction in foreign ownership of banks but a noticeable increase in financial freedom. Both of these dimensions offer useful clues for our discussion on mechanisms below.

Table 7 presents our mechanism analysis. In all specifications we include our main controls, viz. the log of GDP and terms of trade volatility. The monarchy effect turns up as statistically significant in columns 3 and 4, suggesting monarchies experienced greater trade and financial globalization following the crisis when compared with other autocracies. We could not find a significant impact of foreign ownership and state ownership. Since the data on these dimensions is very patchy (we have only one observation for state and foreign ownership before 2007), results on these mechanisms should be treated with caution.

Table 7: *Mechanism analysis*

VARIABLES	(1) Foreign ownership	(2) Government ownership	(3) Financial Freedom	(4) KOF Index
δ_{POST}	-0.240	0.107	-19.23***	-6.373
	(0.190)	(0.0922)	(6.973)	(6.588)
$monarchy_i \times \delta_{POST}$	0.0335	0.0114	13.12***	8.131**
	(0.0817)	(0.0485)	(4.124)	(3.631)
$ln(GDP)_{i,t}$	0.152	-0.118	9.108***	5.963
	(0.115)	(0.0912)	(4.488)	(3.575)
$TOTV_{i,t}$	0.006	-0.0022	0.150	0.0963
	(0.008)	(0.00384)	(0.190)	(0.149)
Observations	291	292	635	827
R-squared	0.122	0.100	0.129	0.102
Number of countries	49	49	43	57

Robust standard errors in parentheses
*** p < 0.01, ** p < 0.05, * p < 0.1

The results in columns 3 and 4 show that monarchies are more integrated and financially open following the GFC (relative to non-monarchies). This is an important part of our explanation for their higher levels of bank concentration post-crisis. We can now begin to synthesize the patterns and results observed throughout our study to consider the political economy framework through which monarchies cultivate higher levels of bank concentration. Given our analysis, we have observed two important characteristics about monarchies. Firstly, they are oil-rich. As Figure 5 suggests, oil-rich countries, whether monarchies or non-monarchies, have generally higher bank concentration. However, for two similarly situated oil autocracies, monarchies are also more open to global trade and finance. A cursory look at the data confirms our prior. Oil-rich autocracies categorized as non-monarchies (e.g., Algeria, Angola, Nigeria, etc.) are systematically less open to trade and finance. The second characteristic we have identified is

therefore that the monarchies in our sample stand out for their relatively outward orientation. Remaining financially open and engaged in international trade is an important part of their development strategy. But, as monarchies, they face a strong compulsion to control the financial sector. This is because autocracies, who thrive on repression and control, require closed systems. Therefore, a more open financial system faces a more difficult trade-off between openness and control. We argue that the natural response to this political objective function is higher bank concentration.

It is helpful to also notice that the monarchy effect is essentially tied to the Gulf Cooperation Council (GCC) countries and their Middle Eastern neighbours. Even those that are not strictly part of the Gulf, i.e. Jordan and Morocco, are honorary members and their economies are indirectly tied to oil fortunes. Our reasoning on the openness-control trade-off rests on the peculiar characteristics of the financial sectors in monarchies. To shed further light on why monarchies adopt an open financial system, we draw on Adam Hanieh's book, *Money, Markets, and Monarchies*. Hanieh raises several salient points about financial sectors across monarchies. Firstly, there is a growth in the size and significance of financial sectors in the Arab world – both non-finance and financial institutions are relying more on capital financing. Specifically, the Gulf are pushing 'financialization' in the Arab world. By 2014, banks located in the GCC held 70% of all banking assets in the Arab world, up from an average of 57% in 2007-2008. The financialization is further complemented by a process of 'capital switching' – where overexposure in one area is offset by geographical and sectoral diversification in another.[2] Therefore, Gulf states want to remain financially open to internationalise their capital.

This is not entirely separate from the volatility arguments raised above. In the run up to the GFC, banking sectors in the Gulf region were characterised by high profits and capital buffers (IMF, 2010). They were also well capitalised, with capital adequacy ratios well above the minimum levels required. This is characteristic of oil wealth insofar as we see non-monarchies that are routinely exposed to commodity shocks strengthen their financial sector, like in Angola or Bermuda for example. Where monarchies differ, however, is in their ability to use openness to diversify. We know the data shows that oil-rich monarchies are more financially open than other oil rich autocracies. The vulnerability to commodity price shocks in monarchies is therefore mitigated through two main mediums: a highly developed financial sector and an open economy.

[2]David Harvey as outlined in Christophers (2011)

It is important to understand the openness-control trade-off in the context of monarchical regimes specifically. In particular, we do not make the assertion that monarchies actively promote higher bank concentration. Rather, this is symptomatic of the business-state relationship that monarchies command. Monarchies are centralised regimes with closed polities. Few corporate groups command financial backing in the Gulf states, and these are usually owned by a handful of prominent families. The financial sector is integral to maintaining this, as can be seen through data on related party lending or loan dominance by few borrowers.

Consider, for example, the case of a larger Construction Group. An investigative report by Reuters (2018) shows how the new policy directives encouraged the corporation to take on large infrastructure projects that were backed by state guarantees. Once the regime tightened the screws on the construction conglomerate, however, many banks were saddled with bad loans. A bank's ability to sustain such loans depends on their asset base - only the large can survive. This highlights an implicit dimension of our analysis: the role of policy uncertainty. Given the control monarchical regimes have on the overall business sector, banks generally want to lend to corporations who have state backing. In the case that the regime's preference shifts away from the connected borrower, the banks are left with bad loans. This creates risk aversion in lending, due to political ramifications of borrowers who do not have such state backing. Therefore, the financial sector plays an important role in the power dynamics that monarchies uphold. These ideas are supported by prior understanding of the political economy of the Middle East (Diwan, Malik and Atiyas, 2019).

Ultimately, monarchies want to remain financially open for two reasons. They are heavily invested in the MENA region, and seek to internationalise their capital for diversification. This diversification is not exclusive to regional dynamics, as it also serves to mitigate vulnerability to commodity price shocks. However, the political structures that monarchical regimes command demand political control over the financial sector. Consequently, a highly concentrated banking system is a *natural* corollary of these dynamics. It allows monarchies to uphold the very fibre that sustains their existence: control.

9 Concluding remarks

We have examined several determinants of banking concentration across this study, offering one of the first systematic studies into the subject. We started with a hypothesis around natural resources and institutional analysis. Following cross-sectional analysis, we instead analysed terms of trade volatility as an economic determinant of banking concentration. Through dynamic panel and difference-in-differences analysis, we find heterogeneity in the impact of these determinants across regime type and over time. We find strong results suggesting that monarchies have diverged from banking concentration trends in comparison to other regimes following the crisis, and that this effect is not shook by the addition of several controls. In doing so, we propose a new conceptual explanation to interpret this different trajectory: namely, a trade-off between openness and control.

This research could be further developed by probing regime *changes* further. This would allow us to understand what the 'no longer a monarchy' effect is. Specifically, Nepal offers a perfect opportunity to create a counterfactual in which the country remained a monarchy. Using data-driven analysis, one could employ a synthetic control method style estimation to model what Nepal would have looked like had it not transitioned into a democracy. In turn we would further isolate the impact of monarchy status, controlling for the global financial crisis itself. Furthermore, we might want to use causal mediation analysis to identify certain mechanisms. For example, given our improved understanding of its determinants, we could use banking concentration as the mediator variables to predict specific economic outcomes. Given that our research has been made richer due to disaggregating two broad terms, viz. 'regimes' and 'financial sector development', we might want to further disaggregate banking concentration itself. Particularly within causal mediation analysis, we would want to know whether concentration is more present in commercial or investment activities. These would have greater impacts on, say, SME business development as opposed to wider economic growth.

The story of disaggregation is emblematic of our research. Perhaps most importantly, we find strong evidence for the greater variation in autocracies that motivated this research design. Typically, dominant literature in this field deploys a crude distinction between weak and strong institutions, or a binary distinction between autocracy and democracy. This paper has emphasised the importance of considering variation within autocracies. The idea is succinctly illustrated in the Anna Karenina principle, which states 'all happy families are alike; each unhappy family is unhappy in its own way'. Consider, for example, that instead of disaggregating by regime type

we used Polity IV throughout our analysis. Both Angola and Jordan have scores of -2, but this would miss the latter's monarchical status in analysis. The 'institutional' argument as it stands in the literature has little purchase: it does not serve to identify those causal mechanisms that weak institutions manipulate.

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11 Appendix

Appendix item 1: unit root test

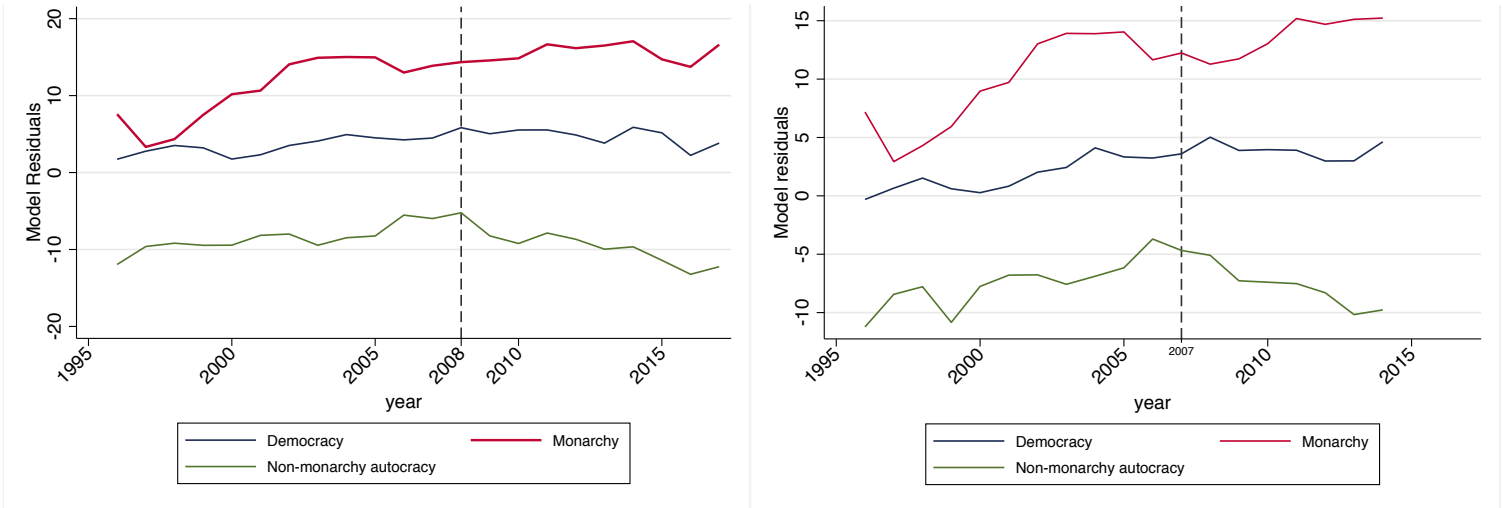
Fisher-type unit-root test for 3 bank asset concentration ratio
Based on augmented Dickey Fuller tests

H_0: All panels contain unit roots	Number of panels = 158
H_a: At least one panel is stationary	Avg. number of periods = 17.59
AR parameter: Panel-specific	Asymptotics: T -> Infinity
Panel means: Included	
Time trend: Not included	
Drift term: Not included	ADF regressions: 1 lag

		Statistic	p-value
Inverse chi-squared(296)	P	513.6153	0.0000
Inverse normal	Z	-4.2806	0.0000
Inverse logit t(694)	L*	-6.3573	0.0000
Modified inv. chi-squared	Pm	8.9439	0.0000

P statistic requires number of panels to be finite
Other statistics are suitable for finite or infinite number of panels

Figure (a): Residuals of banking concentration across time



The left-most graph plots residuals after a regression of banking concentration the natural log of GDP controlling for country and year fixed effects. The right-most graph replicates but controls for terms of trade volatility too.

Appendix 2: data descriptions

Variable name	Description	Source
Crisis dummy variable	This is a year dummy coded 1 if an economy has a banking crisis in a particular year. It is sourced from the World Bank. A crisis here is systemic, i.e. it brings about significant distress in the banking system *and* requires dedicated policy intervention.	World Bank
KOF index	The KOF index is a measure of globalisation. It aggregates dummy variables based on de jure policies relating to financial market integration. In particular, we use the KOF measure of financial globalisation. This looks at dimensions such as the sum of stocks of assets and liabilities of foreign direct investments as a percentage of GDP or reserve position in the IMF. It is sourced using data from the World Bank's Development Indicators and Lane and Milesi-Ferretti (2018).	KOF Swiss Economic Institute
Financial Freedom	The Index scores an economy's financial freedom by looking into the following five broad areas (i) the extent of government regulation on financial services, (ii) the degree of state intervention in banks and other financial firms through direct and indirect ownership, (iii) the extent of financial and capital market development (iv) government influence on the allocation of credit, and (v) openness to foreign competition	Heritage Foundation
Liquid Liabilities	Ratio of liquid liabilities to GDP. Liquid liabilities are also known as broad money, and include various sources of money like currency and deposits in the central bank or foreign currency transferable deposits.	World Bank: Global Financial Database
Private Credit	Financial resources extended to the private sector by domestic money banks as a percentage of GDP. Domestic banks include commercial banks and other financial institutions that accept transfer deposits.	World Bank: Global Financial Database
Non-performing loans	Ratio of defaulting loans to total gross loans. The loan amount recorded as a 'non-performing loan' includes the gross value of the loan as recorded on the balance sheet, not just the amount that is overdue.	World Bank: Global Financial Database
Foreign ownership	Percentage of the banking system's assets that is foreign-controlled.	World Bank: Bank Regulation and Supervision Survey
State ownership	Percentage of the banking system's assets that is government-controlled.	World Bank: Bank Regulation and Supervision Survey

Appendix item 3: Countries and their regime types

United States	Ecuador	Jordan	Argentina	Syrian Arab Republic	Peru*
United Kingdom	El Salvador	Kuwait	Pakistan*	Egypt	Venezuela*
Austria	Guatemala	Oman	Thailand*	Cambodia	Bangladesh*
Belgium	Honduras	Qatar	Algeria	Hong Kong SAR, China	Congo, Dem. Rep.
Denmark	Mexico	Saudi Arabia	Nigeria*	Indonesia*	Libya
France	Panama	United Arab Emirates	Burundi*	Malaysia	Madagascar
Germany	Paraguay	Nepal*		Singapore	Mauritania*
San Marino	Uruguay	Morocco		Vietnam	Sudan
Italy	The Bahamas	Bahrain		Angola	Uganda
Luxembourg	Belize			Botswana	Burkina Faso
Netherlands	Jamaica			Cameroon	Armenia
Norway	Trinidad and Tobago			Ethiopia	Azerbaijan
Sweden	Cayman Islands			Kenya*	Belarus
Switzerland	Cyprus			Senegal*	Kazakhstan
Canada	Israel			Namibia	Kyrgyz Republic
Japan	Lebanon			Tanzania	Russian Federation
Finland	Sri Lanka			Tunisia	
Greece	India			Zambia	
Ireland	Macao SAR, China			Georgia*	
Malta	Philippines			China	
Portugal	Benin			Uzbekistan	
Spain	Ghana			Serbia*	
Turkey	Cote d'Ivoire			Afghanistan*	
Australia	Mali				
South Africa	Mauritius				
Bolivia	Sierra Leone				
Brazil	Georgia				
Chile	Bulgaria				
Colombia	Moldova				
Costa Rica	Ukraine				
Dominican Republic	Cuba				
Lithuania	Czech Republic				
Mongolia	Slovak Republic				
Croatia	Estonia				
Slovenia	Latvia				
North Macedonia	Montenegro				
Bosnia and Herzegovina	Hungary				
Poland	Romania				

*Indicates a regime change. Generally we use that regime type that is dominant throughout the sample period.

Figure (b): Nepal over time

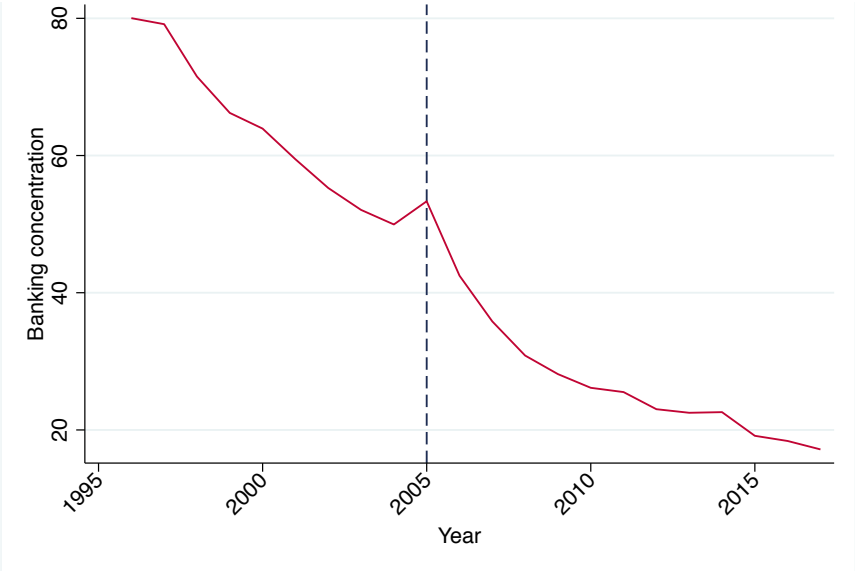


Table (a): Other regime analysis

	All regimes			Autocracy only		
	Dependent variable: 3 bank asset concentration					
VARIABLES	Military	Party	Personalist	Military	Party	Personalist
δ_{POST}	3.914	4.093	3.645	-2.887	-0.674	-1.940
	(2.539)	(2.510)	(2.523)	(3.797)	(3.950)	(3.625)
$regime_i \times \delta_{POST}$	1.559	-5.413**	-5.745	5.226	-4.007	-2.682
	(4.114)	(2.166)	(3.716)	(4.390)	(2.854)	(4.070)
$\ln(GDP)_{it}$	-10.79***	-10.01***	-9.906***	-10.56***	-10.56***	-10.29***
	(1.934)	(1.950)	(1.989)	(2.550)	(2.556)	(2.770)
Observations	2,629	2,629	2,629	1,090	1,090	1,090
R-squared	0.138	0.148	0.146	0.273	0.276	0.271
Number of countries	156	156	156	67	67	67

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

All specifications control for country and year fixed effects with robust standard errors clustered at the country level.