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Drill Baby Drill? Political and Market Influences on Federal Onshore Oil and Gas Leasing in the Western United States

Karen Maguire
Assistant Professor
Department of Economics and Legal Studies
Oklahoma State University

Department of Economics
Oklahoma State
University
Stillwater, Oklahoma

339 BUS, Stillwater, OK 74078, Ph 405-744-5110, Fax 405-744-5180

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1. Introduction

In this paper, I examine the influence of the market and political factors that jointly determine the amount of oil and natural gas leasing on Bureau of Land Management (BLM) lands in the contiguous western United States. The allocation of BLM lands between conflicting uses including conservation, recreation, and resource extraction has led to criticism of the federal government over its administration of these lands. The debate, over how to responsibly develop oil and natural gas resources on public lands, intensified in the 1960s and 1970s with the rise of the conservation movement. (Muhn and Stuart 1988, p.104) During this time the BLM “began to transform itself from an agency primarily processing land and mineral applications into an agency actively planning for the nation’s future needs.” (Muhn and Stuart 1988, p. 106) Critics of the leasing process often argue that political motivations are the primary factor in determining the amount of leasing rather than legitimate oil and natural gas resource needs. The paper examines oil and natural gas leasing on BLM lands after the conservation movement had begun, from 1983 through 2008, in order to determine if leasing was shifting with the political winds or if market factors were the primary factor in determining leasing outcomes.

Previous research has generally focused on examining either oil and natural gas markets or federal political and bureaucratic outcomes generally. There are some notable exceptions; Libecap and Smith (2002) and Libecap and Wiggins (1985) examined the historical role of markets and politics in influencing the development of unitization contracts. (Libecap and Smith 2002; Libecap and Wiggins 1985) Other work that focuses on the market and regulatory framework unique to federal lands examines the disparate influence of federal and private ownership in development outcomes. (Fitzgerald 2010) Much of the remaining empirical work focuses on offshore rather than onshore oil and gas development on the federal mineral estate. In

addition, this literature does not focus directly on the political aspects of lease issuance. This literature has instead focused on auction price theory to analyze the process for issuing competitive leases (Moody and Kruvant 1988; Hendricks, Pinske, and Porter 2003; Hendricks, Porter, and Tan 1993), or on the determinants of oil and gas supply and production using a market supply and demand framework. (Walls 1992; Iledare and Pulsipher 1999)

The literature on the federal political environment in the United States and its influence on bureaucratic outcomes has been mainly focused on two areas: the influence of political parties, and the influence of politicians on bureaucratic outcomes. The findings regarding political party vary. There is a significant literature arguing that political parties matter in a variety of political outcomes (Levy 2004; Levitt and Snyder 1995; Rohde 1994; Cox and McCubbins 1994), but there is also a literature that argues that the role of political parties is dominated by other political factors including individual ideology and the legislative committee system. (Poole and Rosenthal 1997; Shepsle and Weingast 1987) This paper delves into the debate by including measures of political party and ideology for various salient political actors in federal leasing, including the federal legislative and executive leadership as well as relevant legislative committee leaders.

In regards to political and bureaucratic influence, several papers have examined the degree of influence that a political leader has on federal bureaucratic agencies in the United States. One set of literature argues that bureaucrats have significant discretion in terms of bureaucratic outcomes (Niskanen 1975) while another body of literature argues that elected officials play a dominant role in dictating the bureaucratic environment and legislative outcomes. (Cropper et al. 1992; Ringquist 1995; Shipan 2004; Weingast and Moran 1983; Wood 1988; Wood and Waterman 1991) While this literature has provided analyses of the role of various

federal bureaucracies, it has not provided an evaluation of the influence of federal politics on BLM leasing in the western United States.¹

2. Background

State Oil and Gas Resources

The western states were chosen because they contain approximately 81 percent of the proved natural gas reserves and 90 percent of the proved oil reserves in the contiguous United States over this time period.^{2,3} Also, these states compose 92 percent of the leases issued by the BLM over this time period. The remaining eight percent is dispersed across an additional 31 states in the eastern United States.⁴

Table 1 lists the states included in the analysis and gives information on the oil and gas resources in each state. The table demonstrates the significant contribution that several of the sample states make towards United States oil and gas production. It also illustrates the variation in resource endowments across states in the sample.

<Table 1>

Leasing Process

To understand the potential avenues of political and market influence on oil and gas leasing, it is important to understand the history and process of leasing. The BLM, under the direction of the Department of the Interior (DOI), is responsible for almost 700 million acres of

¹ My paper does not directly measure the relationship between bureaucrats and elected political leaders and instead focuses on the role of federal political leadership and the influence that political party and ideology have on the overall political environment.

² The western states include Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

³ The time frame for these statistics is from 1978 through 2008.

⁴ Alaska also has significant oil and natural gas reserves; however, given the unique political and resource environment the state is excluded from the analysis. Also, the LR2000 leasing database maintained by the BLM does not contain information for Alaska.

federal mineral estate lands, mostly in the western United States. This includes 258 million surface acres of BLM lands and the federal mineral estate that lies under federal lands managed by other federal agencies.^{5,6,7} In the federal mineral estate, approximately 12 million acres contain oil and natural gas and of these approximately 470,000 acres have oil and gas activities. According to the BLM, the “domestic production from over 63,000 Federal onshore oil and gas wells accounts for 11 percent of the Nation’s natural gas supply and five percent of its oil.”⁸ (*BLM Oil and Gas* 2009) Onshore oil and gas resources thus compose an important part of the nation’s energy supply.

The BLM’s responsibility for managing these resources derives primarily from two historic acts: The Mineral Leasing Act of 1920 and the Mineral Leasing Act for Acquired Lands of 1947, which give the BLM responsibility for oil and natural gas leasing. (McDonald 1979, pp. 6-7, 15-16). While the BLM has existed since 1946 and has issued mineral leases since its inception, it was not given its official mission until Congress enacted the Federal Land Policy and Management Act of 1976 (FLPMA).⁹ (Muhn and Stuart 1988, p. 158) Oil and natural gas leasing at the BLM continues to be dictated largely by the two historic acts of 1920 and 1947, but the FLMPA underscored the overall mission of the BLM as an agency dedicated to “the principles of multiple use and sustained yield.” (Muhn and Stuart 1988, p. 158) In addition to

⁵ In addition to leasing on BLM lands, the BLM also issues leases on lands managed by other federal agencies, primarily the U.S. Forest Service. For the analysis, all leases issued on Forest Service lands have been excluded. Future analysis will focus on analyzing potential leasing differences between BLM and Forest Service lands.

⁶ In addition, the federal mineral estate includes federal minerals under surface land that is privately owned, but for which the federal government administers the subsurface mineral rights.

⁷ Private land leases are not tracked by all states in the sample. For the sample, some leases on private lands have been included where the data did not allow for their exclusion.

⁸ Statistics are from 2004.

⁹ Prior to 1976, the BLM inherited its mission from the two organizations that preceded it, the General Land Office and the Grazing Service.

the influence of the FLMMPA, the 1970s began with the passage of the National Environmental Policy Act of 1969 (NEPA), which profoundly influenced the way that the BLM manages its public resources. After NEPA, consideration of environmental impacts from oil and gas leasing and other activities became a legally dictated process requiring environmental impact statements and additional public influence in the overall land use planning process. (Muhn and Stuart 1988, p. 158)

After the 1970s, the mission of the BLM continued to evolve and was shaped by three other major regulatory changes. The Federal Onshore Oil and Gas Leasing Reform Act of 1987 (FOOGLRA) and the Energy Policy Acts of 1992 and 2005.^{10,11} Since the passage of FOOGLRA in 1987, the leasing process begins with a request from an individual or corporation interested in leasing the land. Then the BLM reviews the request and if the land is not restricted from leasing, opens up the requested parcel of land for a lease auction, abiding by any stipulations for environmental protection.¹² (*BLM Competitive Leasing* 2009) The lease holder gains “the right to explore and drill for, extract, remove, and dispose of deposits of oil and gas found on the lease.” (*BLM Competitive Leasing* 2009) In addition to competitive leases issued at auction, the BLM also issues noncompetitive leases. Since 1987, noncompetitive leases are offered only after failing to be purchased during a competitive auction. (*BLM Noncompetitive Leasing* 2009) Prior to 1987, there was no requirement that leases be offered at competitive

¹⁰ FOOGLRA amended the leasing act of 1920, which led to changes in the definition of leasing types and gave the Forest Service the authority to dictate leasing on their lands, among other changes.

¹¹ Since the energy policy act passed in 1992, both competitive and noncompetitive leases are valid for a minimum of 10 years, and remain valid as long the lease is producing. Prior to the 1992 Act, competitive leases were valid for only five years if not producing.

¹² The leases are sold at competitive auctions that are held quarterly. (*BLM Competitive Leasing* 2009)

auction prior to noncompetitive purchase.¹³ This significant change in leasing type had a strong influence on the number of non-competitive leases issued as is shown in Figure 2.¹⁴ Also, the Energy Policy Act of 2005 included tax incentives for oil and natural gas development and was designed to increase domestic oil production. I expect this regulation to lead to increased leasing.

While leasing is a key step in the oil and natural gas production process, it is important to note that leasing a parcel of land does not lead directly to production, because in addition to a lease, a producer is required to have a permit for each well drilled. The permitting process follows the issuance of a lease. Once a leaseholder applies for a permit the BLM does a site review to determine what, if any, environmental impacts must be considered.¹⁵ The BLM will approve or deny a permit based on whether it meets the requirements of existing environmental regulations.¹⁶ Although permitting is an important land management issue, this project focuses on leasing. The lease provides the producer with the right to develop the resource, after obtaining a valid permit, and is therefore a critical step in producing oil and gas. Other work extends this analysis beyond federal leasing to well permitting issues.

¹³ Leases could be requested by producers and sold without entering the competitive auction process.

¹⁴ For the analysis, the focus is on competitive leases only. After 1987, the influence of politics on leasing is expected to be strongest with competitive leases. These leases represent the point where the BLM determined that the lands would be made available for leasing. After 1987 all noncompetitive leases issued had already been offered for competitive lease by the BLM. The empirical analysis includes an indicator to capture the effects of this significant regulatory change

¹⁵ For drilling operations that are expected to have significant environmental impacts, an Environmental Impact Statement (EIS) is required, while for less significant expected impacts a less stringent environmental assessment (EA) is required.

¹⁶ If approved the permit is valid for two years or until the lease expires. (*BLM Environmental Review and Permitting 2009*)

Political Influence

For the 11 westernmost states in the contiguous United States approximately 25% of the land is under the management of the BLM (See Table 2).¹⁷ This varies significantly, from 68% in Nevada to only 1% in Washington. Nelson argues that due to federal ownership, the federal government exerts stronger political influence in these 11 western states than in the United States generally. (Nelson 2000, p. 143) Specifically he states that there “is a de facto legislature for much of the rural West and a de facto executive branch, both located in Washington.” (Nelson 2000, , p. 144)

< Table 2 >

To investigate the potentially disparate role of political influence in these westernmost states, the BLM states, I analyzed them separately.^{18,19} The BLM states in the sample are quite distinct from the remaining states in terms of BLM lands, the additional states generally have less than 1% of their lands owned by the BLM.²⁰ The additional states are geographically adjacent to the first sample and contain a mixture of oil and natural gas producing states such as Texas and Oklahoma and states such as Nebraska that do not have significant resources. This variation also occurs in the 11-state sample, which includes Wyoming and Colorado, both important oil and natural gas producers and states such as Washington and Oregon that have

¹⁷ The 11 westernmost states geographically make up a subset of the larger 17-state sample. The 11-state sample includes Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

¹⁸ The 11 westernmost states or 11 western states refers to the 11 westernmost states in the contiguous United States.

¹⁹ Also, I analyzed the full sample including an analysis of the interaction between the BLM states and politics.

²⁰ To verify the definition of BLM states based on Nelson’s argument, I used a Probit model to predict the BLM states based on BLM acres and compared the predicted values with the BLM state categorization. The results indicate a clear distinction between BLM states and the other states in the sample.

much lower levels of oil and natural gas resources. See Table 2 for information on federal lands in each state.

To analyze the political influence on oil and natural gas leasing, I examine several measures of the political environment. Specifically, I analyze the influence of the federal legislature, the party and ideology of the Senate Majority Leader, as well as the party and ideology of relevant committee chairs in the Senate. Due to the fact that Congress provides the regulatory framework that the DOI and BLM operate in, I expect that the legislature will influence leasing.²¹ The role of relevant committees is expected to be principally important given their responsibility for setting the agenda of Congress. Potential legislation must pass out of committee prior to consideration by the full Congress. Also, because committees can use their influence to hold agencies and corporations publicly accountable through hearings, I expect committee ideology to have a stronger influence than the legislative leadership.

In addition to legislative influence, I analyze the party and ideology of the President. The President appoints the leadership of the DOI and sets the tone for the political climate in the United States generally. Due to their appointment by the President, there is not a party difference between Presidents and Secretaries of the Interior. For this reason, the President's party and ideology are expected to also characterize the leadership at the DOI. For each elected official, I expect both party and ideology to be important in influencing leasing.

The conventional wisdom is that in politics, party matters. It is a signal of a politician's stance on a variety of social and economic issues. Republicans generally have pushed for increased domestic energy development on federal lands while Democrats have been more reticent to lease, noting the environmental impacts of development. Prior to elections, these

²¹ Also, appointees to the Secretary of Interior and BLM director posts are approved by the federal legislature.

divergent party stances on oil and gas leasing are incorporated into each candidate's platform. After election, commitment to a particular party tends to constrain a politician's choices. (Levy 2004; Cox and McCubbins 1994) For these reasons, party differences among politicians are expected to lead to a clear delineation in leasing outcomes along party lines. Given the platforms of the Republican and Democratic parties, one would expect pro-oil and gas development policies under a Republican administration and reduced oil and gas development under a Democratic administration.

Individual ideology is also expected to play an important role. The ideology measure captures the degree of conservatism of each individual politician based on their voting history. The measure provides a unique measure for each individual and Congress and therefore provides a more detailed measure for each politician than the overall political party measures. Given the variance of the measure over individuals and across time, I expect ideology to be a more precise measure of the political environment than political party.

3. Data

To analyze this research question, I collected data from a variety of sources and constructed a matrix of market and political variables to determine what factors were influencing oil and natural gas leasing across a 17-state sample over a 25 year time frame from 1983 through 2008.^{22, 23}

< Figure 1> < Figure 2>

²² The time frame is dependent on the control variables that are included. Specifically, well costs are available only through 2007.

²³ Lease information was collected from the BLM LR2000 database, which contains all leasing activity tracked by the BLM. Specifically, the "LR2000 provides reports on BLM land and mineral use authorizations for oil, gas, and geothermal leasing, rights-of-ways, coal and other mineral development, land and mineral title, mining claims, withdrawals, classifications, and more on federal lands or on federal mineral estate." (*BLM LR2000* 2009)

For completeness, I analyzed both the number of competitive, noncompetitive, and overall leases issued by state and year.^{24,25} Due to variation in the type of lease, the dependent variables may be differentially affected by the market and/or political variables. In particular, the policy changes such as FOOGLRA is expected to diminish non-competitive leasing, but its effect on competitive leasing is not clear. In addition to the dependent variables, I constructed several market variables. The market data include information on state prices for both oil and natural gas that I collected from the Energy Information Administration (EIA).²⁶ These prices are reported by the EIA annually by state. See Figure 3 for U.S. oil and gas prices over this time period. Also, I constructed a measure of the annual real well costs for the United States based on information provided by the EIA. Well costs, measured in thousands of dollars per well drilled, provide a measure of the direct costs that producers face in extracting resources. Lastly, I include annual well depth, which is a measure of technological progress as drilling depth has increased with newer drilling techniques, such as hydraulic fracturing. See Figure 4 for changes in well costs and well depth over time.

< Figure 3 > < Figure 4 >

In addition to market factors, the key variables of interest in the analysis are the political indicators. The political party indicators are constructed as binary measures (0 = Democrat, 1 = Republican) for the chair of the Senate Natural Resource Committee (SNRC), chair of the Senate Environment and Public Works Committee (SEPW), chair of the Senate Appropriations

²⁴ I completed the analysis for acres leased in addition to number of leases and the results were consistent with those presented. They are available upon request. Figure 1 shows the acres leased and number of leases issued from 1983 to 2008, the pattern is consistent.

²⁵ Overall leasing is the sum of competitive and non-competitive leasing by state and year.

²⁶ All prices and well costs are real prices, in chained (2000) U.S. dollars, calculated by using gross domestic product price deflators from the EIA.

Committee (SAC), the Senate Majority Leader, and the President of the United States.²⁷ (*Chairman of Senate Standing Committees* 2009; *Majority and Minority Leaders and Party Whips* 2009; Swift et al. 1989) Due to a high degree of correlation within the Senate, the measures are analyzed separately. These measures do not change for individuals in the sample and therefore vary over time only. In addition, I use a continuous ideology measure that provides a liberal-conservative measure based on voting history for each legislator and the President.²⁸ (Carroll et al. 2010) The indicators change at most every two years, by Congress, across individuals for the sample time frame. See Figure 5 for a depiction of the change in ideology scores over time. The empirical results are presented below.

< Figure 5 >

4. Empirical Model

The empirical analysis is focused on measuring the effect of the elected federal political influence on the number of natural gas and oil leases issued in each state and year by the BLM on BLM lands after controlling for market factors. The final empirical specification is a state-year panel with state fixed effects from 1983 through 2008 for a 17-state sample.²⁹ In addition, I analyzed interactions to determine if there were differential effects on the 11 westernmost states, the BLM states. (See Table 2 for a list of BLM states.)

²⁷ These committees were listed as a subset of the relevant committees with influence over the DOI by the Office of Congressional and Legislative Affairs. (DOI, 2010)

²⁸ The ideology scores that I used are the DW-Nominate scores. These scores estimate the conservative-liberal position of each legislator using roll call voting records. The scores are scaled to range generally between -1, liberal and 1, conservative.

²⁹ Those regressions that include well costs are analyzed through 2007 only.

The reduced-form specification of the state fixed effects model is:

$$Y_{it} = \alpha + \beta_1 Z_t + \beta_2 p_{it} + \beta_3 Wc_t + \beta_4 WD_t + \beta_5 \text{Linear Time Trend}_t + \beta_6 \text{Post1988 Indicator} + \beta_7 \text{Post1992 Indicator} + \beta_8 \text{Post2005 Indicator} + \varepsilon_{it} \quad (1)$$

where i = state

and t = year.

Y_{it} represents the annual state number of oil and natural gas leases issued on BLM lands³⁰. Z_t represents a set of federal executive and legislative political party and ideology indicators. Resource Price, p_{it} , denotes natural gas or oil current prices. Well costs, Wc_t , contain direct well costs, while WD_t , contains well depth that change over time only. I expect that increases in well costs will lead to decreases in the amount of leasing, while increases in well depth, indicative of improving drilling technology may lead to increased leasing. Time-Trend is a year indicator to control for overall economic trends and potential trends in leasing. Also, the three indicator variables measure the effect of the three major regulatory changes. Two specifications were analyzed; state fixed effects and a BLM state interaction specification to determine if there is a statistically significant difference between BLM and non-BLM states. The analysis presented below begins with a discussion of the role of political actors, followed by a discussion of the various market and regulatory factors.

< Table 3 >

< Table 4 >

³⁰ Separate analyses were done for competitive leases, non-competitive leases, and both types of leases jointly.

Political Influence

Overall, my findings indicate that there is no consistently statistically significant effect of political party or ideology on leasing outcomes, see Table 5.^{31,32} Interestingly, when the political variable is interacted with the BLM state indicator in a state fixed effects regression, there are statistically significantly different affects for non-competitive leases, see Table 6. Surprisingly, the findings indicate that in non-BLM states a more conservative ideology leads to less leasing, but this effect is mitigated in BLM states. In BLM states, a more conservative ideology has a positive influence on leasing as compared with non-BLM states. This finding is not robust for the other political indicators, however. While there is a diminished influence for non-BLM states for the political party of the SNRC party and SEPW ideology coefficient as well, the other variables do not demonstrate a statistically significant difference in the role of politics in BLM and non-BLM states. Given the overall lack of significance, there is a not a clear distinction between the role of politics in BLM states and the other states, indicating that the BLM states hypothesis does not hold generally.

< Table 5 >

Regulatory Framework

In addition to politics, regulatory changes are expected to significantly influence leasing outcomes. To investigate the role of regulation on leasing, three time period indicators were used to represent the three periods of significant regulatory change. FOGLRA proved to be of particular importance in influencing the acres of competitive leases that were issued. This

³¹ These results are consistent across the political variables. Results for other political indicators are available upon request.

³² To examine the influence of environmental special interest groups, the percentage of the state population that is a member of the Sierra Club was also analyzed. The variable was consistently not statistically significant.

regulatory change was the largest in terms of the number of changes and additions to the code of federal register for leasing and dictated that all leases were required to be issued competitively prior to their issuance as noncompetitive leases.³³ The results in column 2 in Table 6 indicate that after the passage of FOOGLRA there were on average 114 less leases issued per state and year. This is an economically significant result considering that the mean number of leases issued was approximately 139. The graphically demonstrated decrease in non-competitive leases that, see Figure 2, was reinforced by the empirical analysis. The subsequent Energy Policy Act of 1992 did not statistically significantly affect leasing. However, the Energy Policy Act of 2005 did have a positive and statistically significant effect on competitive leasing. According to the results presented in Table 5, after the Energy Policy Act there was on average an increase of approximately 72 leases per state and year, an economically significant effect. In addition, the number of non-competitive leases continued to decline after the 2005 policy intervention, approximately 55 fewer non-competitive leases were issued in each state and year after the 2005 Energy Policy Act. The effect on leasing overall was not statistically significant for any of the regulatory interventions. The policies changed the distribution of leasing between competitive and non-competitive leases, but did not affect the overall leasing numbers.

Prices and Market Factors

In addition to political and regulatory measures, the role of market factors was investigated. Table 5 results indicate that natural gas and oil price are not significant predictors of leasing. However, for non-competitive leases and both leasing types analyzed jointly, natural gas and oil prices are jointly significant predictors of leasing. Indicating that for non-competitive

³³ “The Code of Federal Regulations (CFR) is the codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government.” (CFR, 2010)

leasing and leasing generally, that increased resource prices lead to increased leasing.³⁴ For competitive leasing, both well costs and well depth had a statistically significant effect on the number of leases issued. (See Table 5) For well costs, a 10 percent increase led to an approximately 3.8 percent decrease in leasing on average. As expected, higher costs did lead to diminished leasing, but unexpectedly the result held only for competitive leases. Well depth had a positive effect on competitive leasing. Increasing well depth, an indicator of technological progress led to an increase in leasing. Once again, the affect was only significant for competitive leases.

In terms of the disparate role of well depth in BLM states, while there is not an overall effect of well depth on non-competitive leasing and overall leasing (see Table 5), the effects were statistically different in the BLM states. (See Table 6) The effect of well depth was mitigated in the BLM states, indicating that leasing in BLM states was not enhanced as significantly by changing technology. These states have significantly more leasing than non-BLM states and this indicates that this lease issuance is not driven primarily by technology.

< Table 6 >

³⁴ Short-term oil futures prices, constructed using futures contracts for delivery one month in the future and available back to 1983 were also analyzed and were also not consistently statistically significant, but were jointly significant with natural gas prices as well. Short-term natural gas futures prices were not analyzed due to data limitations, they are available only back to 1994.

Conclusions

The results indicate that the federal elected political influence on oil and natural gas leasing outcomes on BLM lands is not statistically significant. Also, the expected dominance of the federal political influence for the BLM states relative to the full sample was not robustly demonstrated counter to the BLM states hypothesis.

The market influence was more consistent, but interestingly varied by the leasing type. Increased prices were the key market factor in non-competitive leasing and leasing generally, with higher oil and natural gas prices leading to increased leasing. While well costs and technology played a larger role in determining competitive leasing outcomes. Finally, regulation, particularly the passage of FOOGLRA in 1987 and the Energy Policy Act of 2005, played a key role in influencing the composition of leasing outcomes leading to decreased non-competitive leasing but no overall influence on leasing generally. For oil and natural gas leasing on federal lands, the market factors played a dominant role in determining leasing outcomes, while political ideology was not a major factor.

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