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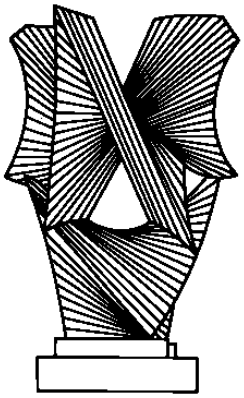

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REVERSE REGULATORY ARBITRAGE: AN AUCTION APPROACH TO REGULATORY ASSIGNMENTS

M. Todd Henderson and Frederick Tung*

In the years before the Financial Crisis, banks got to pick their regulators, engaging in a form of regulatory arbitrage that we now know was a race to the bottom. We propose to turn the tables on the banks by allowing regulators, specifically, bank examiners, to choose the banks they regulate. We call this "reverse regulatory arbitrage," and we think it can help improve regulatory outcomes. Building on our prior work that proposes to pay bank examiners for performance—by giving them financial incentives to avoid bank failures—we argue that bank supervisory assignments should be set through an auction among examiners. Examiner bidding would generate information about examiners' skills, experience and preferences, as well as information about each bank. Provided examiners bear the upside and downside of their regulatory behavior, a bidding system for regulatory assignments could improve the fit between examiners and the banks they supervise, thereby enhancing regulatory efficiency.

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I. INTRODUCTION

A. Why Fiat?

A scarce resource, like labor, may be allocated in one of two ways: by the price mechanism or by fiat. With the price mechanism, the resource flows via market transactions to where it is valued most highly. By contrast, fiat allocation occurs through the command of a person with authority within a hierarchy. All economic activities face this choice of resource allocation mechanism, and all institutions—be they firms, families, or governments—deploy a mix of these approaches. For example, the head of a family may want the grass cut. She has two basic choices: she can command that a family member cut the grass, or she can put the work out to bid among family members or landscaping companies. The choice will be determined by the relative costs and benefits of each approach. It is simple and cheap to direct a family member to do the work, but it might be done better or more efficiently if put out to bid.

As the costs of using market transactions fall (or rise) relative to the costs of fiat, the more (or less) work will be allocated by the price mechanism instead of fiat. Continuing with the grass-cutting example, if the costs of finding a landscaping service, evaluating the quality of the service, and negotiating an attractive price are lowered—say, because of the inception of an online marketplace for matching grass cutters and homeowners—then at the margin, families will be more likely to use a market than the fiat approach.

The accepted practice across government is that regulatory resources, such as investigators or prosecutors, are allocated by fiat by department or agency heads. Bank examiners are assigned to particular banks at the discretion of higher-level regulators in the agency hierarchy. Higher-ups in the agency decide

based on their judgment about things like skill, fit, work ethic, knowledge, and expertise. They must address complicated tradeoffs, such as the risk of capture versus the benefits of experience from regulators working with the same firms year after year. One agency solution is to rotate regulators "periodically to ensure that an objective and fresh supervisory perspective is maintained."[1] But there are downsides to a fixed rotation system: knowing when one's stake in a particular institution will end may provide opportunities to hide costs in future periods.[2] In addition, the assignment process for bank examiners is completely opaque to outside observers. Although a great deal depends on the efficient deployment of regulatory resources, the public knows shockingly little about the process.[3]

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[1] See, Office of the Comptroller of the Currency, Large Bank Supervisory Handbook, available at http://ithandbook.ffiec.gov/media/22019/occ-comptr_handbook_large_bank_superv.pdf . See also "At the OCC, examiners in charge for each bank have contracts to cover a bank for up to five years. After that, they are rotated to another bank or assignment, which can mean a move to another city. We want to keep them fresh and learning. It's a very healthy thing to do. It's not always convenient for them." http://www.charlotteobserver.com/2011/07/10/2442855/financial-crisis-lands-more-bank.html (quoting _____Brosnan, a long-time OCC official).

[2] For an example of this problem in another context, *see* Amity Shales, "China's Katrina Shows Post-Communism No Big Easy," BLOOMBERG, May 21, 2008 ("China intentionally rotates its governors to ensure they don't build up personal machines. Perversely, that freed officials from living with the consequences of shoddy construction. Soon after the ribbon is cut on the new school, they move on to the next post.").

[3] Although there is no public disclosure concerning how these decisions are made or what factors inform them, we assume bank regulators—agencies like the Office of Comptroller of the Currency and the Federal Reserve—allocate regulatory resources based on assessments of fit, capability, and expertise, as well as the bank-specific information held by examiners. While we do not pooh-pooh the value of these judgments, considering alternative

(continued next page)

We are unaware of any criticism of the fiat approach to regulatory resource deployment in the legal literature or elsewhere.[4] This is surprising given the widespread existence of regulatory failures and the well-known pathologies of bureaucracies, particularly those relating to regulatory assignments. For example, regulatory capture is a serious concern, and assignment schemes may have important consequences for combating or exacerbating capture. Our auction approach may make capture more difficult than under the current system of fiat assignment, where interest groups need only target the individuals responsible for assigning work in order to influence regulation. Under our approach, or in any hypothetical labor market within an agency, interest groups would have to influence all potential market participants.

More generally, the fiat approach is a one-sided approach to a two-sided problem. Regulatory higher-ups have information about examiner fit and capability, but so do examiners. Insofar as the examiners cannot convey information relevant to setting regulatory assignments, the matching of examiners to banks fails to utilize all of the information available. This problem affects all economic transactions, and auctions are a well-accepted mechanism for aggregating and processing information, as well as generating effi-

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assignment mechanisms may offer improvements in regulatory efficiency. Moreover, the lack of transparency about the process means other values, like managerial self interest, nepotism, political favoritism, and so on, may be just as likely to inform allocation decisions.

[4] The post-Financial Crisis reform proposals of academics, pundits, and legislators do not address regulatory assignment mechanisms, despite the fact that examiners were aware of but utterly failed to prevent enormous amounts of excessive risk in the banking system. While factors other than examiner assignment methods were assigned undoubtedly played a large role in the crisis, we believe that misallocation of regulatory resources is a problem that must be addressed as well.

cient competition by buyers and sellers of the product or service in question.

Our goal is two fold. First, we attempt to fill this gap in the literature by considering the costs and benefits of the current approach to regulatory resource deployment. We develop a theory of regulatory resource allocation, pointing out the shortcomings of the pure fiat approach, as well as potential strengths. In light of recent regulatory failures, it is time to subject current examiner assignment methods to rigorous scrutiny.[5]

Second, by using bank regulation as a sustained example, we propose a system of resource allocation pursuant to which examiners would bid for work at a particular bank. We argue that using price-based auctions to inform the assignment of bank examiners would help reveal valuable information held within agencies but not readily available to higher-ups making allocation decisions. Such as system would also serve as a self-correcting mechanism for the risks of the capture of individual examiners, as well as reveal valuable information about bank risk to agency managers.

Our proposal takes a page from private sector practices that muddy the classic Coasean firm-market dichotomy.[6] A number of firms, recognizing the infor-

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[5] Getting regulatory assignments right may be especially important in light of recent work on the problems inherent in the current regulatory approach to banking. See M. Todd Henderson & James Spindler, "Why Bank Regulation Failed . . . and Will Continue to Fail," Working Paper, on file with authors.

[6] In his work on the nature of the firm, Ronald Coase distinguished firms from markets, defining firms as loci where hierarchical commands effect transactions. Outside of the firm, by contrast—i.e., in markets—transactions are characterized by voluntary exchange. Ronald H. Coase, "The Nature of the Firm," 4 Economica 386 (1937). Coase concluded that the firm's boundary is determined based on where the net benefits of the fiat approach (such as simplicity) are outweighed by the net benefits of the price approach (such as information generation). Coase's work gener-

(continued next page)

mation aggregation and matching potential of markets, have incorporated market mechanisms into their organizational decision making. Markets within hierarchies have emerged, and preliminary research largely confirms the promised benefits of the internal market-based mechanisms.[7] Internal prediction markets and job markets have improved forecasting and resource allocation within hierarchies. We propose bringing this private-sector learning to the government.

B. Reversing Regulatory Arbitrage

In the run-up to the Financial Crisis of 2007-2008, banking regulation failed. Government post-mortem reports on bank failures demonstrate widespread *regulatory* failure.[8] As we've show in prior work, bank examiners routinely identified fundamental weaknesses in banks many years before their collapse, yet failed to act aggressively enough to forestall problems that eventually led to disaster.[9] For example, examination reports identified overly aggressive home mortgage origination practices at banks like Washington Mutual, but regulators failed to act because of the profits banks were making.[10]

In *Pay For Regulator Performance*, we argued that one cause of this failure was the way bank examiners are paid: low-powered incentives delinked from

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ates a prediction that as the costs of market transactions fall (rise) relative to the costs of fiat, more (less) work will be allocated by the price mechanism, instead of fiat.

[7] *See infra* Part II.B.__

[8] We recognize there were many other types of failures that contributed to the Financial Crisis, and we do not believe it was solely a government problem. Our only claim is that regulatory failure contributed to the Crisis.

[9] For a discussion of the post-mortem accounts of bank failures, *see* M. Todd Henderson & Frederick Tung, "Pay for Regulator Performance," __ S. CAL. L. REV. __ (2012).

[10] Notwithstanding specific instructions not to do just this. *See* id at __.

desired outcomes yield low effort and misdirected work.[11] In that paper, we recommend performance pay for examiners in the form of phantom debt and equity securities of the banks they regulate, as well as a special takeover bonus tied to the timing of the decision to take over a failed bank.[12] The idea is to link bank examiner compensation with desired social outcomes, so as to directly reward good regulatory outcomes and deter bad ones.[13]

While beneficial for incentivizing better performance, incentive pay for examiners by itself cannot overcome allocative inefficiencies from command-and-control assignments. Consider the well-known problem of regulatory capture. Many bank examiners work intensely at one bank for long periods, and this can bias them. Some examiners may have been tempted to shade facts or forestall regulatory action because of a desire to avoid conflict with people the examiner knows well and works with on a daily basis. Some examiners may have been more interested in currying favor with the banks they regulated in hopes of enhancing future employment opportunities than in pursuing the public interest in safe and sound banking. If examiners bear the costs of regulatory laxity and these costs outweigh the personal gains, then this problem is reduced. But if pay and other work-related incentives are insufficient to overcome this problem, then

[11] *See* id at __.

[12] *See* id at __.

[13] The "optimal" social outcome here is a complicated thing to define in the abstract, but it involves the efficient amount of lending to the most desirable sectors of the economy. The efficient level of lending trades off the potential for increasing economic growth by increasing the velocity of money in the economy with the downside from losses caused by too much lending. *See* M. Todd Henderson & James Spindler, "Why Bank Regulation Failed . . . and Will Continue to Fail," Working Paper (2012) (on file with author).

assignment issues become crucial.[14] Even if forced to bear the downside of lax regulation, every regulator only operates with the limits of his or her knowledge, expertise, and awareness of the costs and benefits of various regulatory choices. An auction for regulatory services brings the views and information of many regulators to bear on the efficiency of regulatory assignments.

Capture is not the only potential problem. If regulators are initially assigned based on favoritism, nepotism, politics, or other considerations unrelated to performance, even a well-designed incentive pay program may not improve the quality of bank supervision.[15] If bank examiners are mismatched with the banks they regulate, even well-intentioned, well-incentivized examiners may perform poorly. This problem could be addressed to some extent by changing the incentives of those doing the assigning, but as discussed elsewhere, there may not be a reliable way to do this.[16] Moreover, an auction system can simply be the other side of this two-sided problem. Because incentive pay structures will always be imperfect, the allocation issue is an important compliment to any pay-for-performance program.

In this Paper, we argue that agencies should replace (or at least supplement) the fiat assignment approach to resource allocation with a price-based approach.[17] Specifically, we propose an auction-based approach in which examiners would bid for regulatory

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[14] In addition, if agency higher-ups have perfect information about the risks of capture in every case and work rules do not prohibit resource allocation, then the problem is reduced.

[15] The problem is even more acute in the absence of an incentive pay scheme.

[16] *See* Henderson & Tung, *supra* note __ at __.

[17] An (imperfect) model is the current government procurement process, pursuant to which outside suppliers bid for government contracts.

assignments at particular banks.[18] If examiners are forced to internalize the costs and benefits of their regulatory decisions, a well-designed assignment auction would generate information about individual examiners' relative competencies for supervising particular banks. Auctions elicit better information about the most efficient allocation of regulatory resources than fiat. Better information would enable better matches between regulators and the regulated, as well as potentially lowering the costs of effective regulation.

Government agencies already use the price mechanism for some allocation decisions. Numerous agencies assign contracts to outside suppliers through competitive bidding. Instead of a government bureaucrat simply commanding a lower-level bureaucrat (of her choosing) to perform a given task, tasks are defined, put to bid, and assigned to the individual or entity best able to perform the task.[19] While not without its problems, this approach may also be fruitful in making internal assignments, since the costs and benefits of work assignments are not fundamentally different from other types of resource allocation questions.

We recognize that supervisors making internal work assignments may have better information about the resources at hand than government procurement officers have when awarding outside contracts. We therefore do not propose that agencies make regulatory assignments available to any willing bidder,[20] or

[18] Technically, our proposal is a reverse auction, where sellers of regulatory services (not buyers) compete for supervisory assignments. Bids decrease over time with a reverse auction, with the lower bidder winning the auction.

[19] By "best" we mean the examiner who can achieve the optimal level of bank activity and risk taking at the lowest regulatory cost.

[20] As we discuss below, *see infra* Part IV.E, the more optimal the incentive compensation contract, the lower the costs of expanding the range of potential examiners beyond a particular agency.

even that the lowest bid would necessarily always win,[21] but simply that examiner assignments be based at least in part on a bidding process designed to match resources to their most efficient uses. Examiners may have valuable information about how resources should best be assigned that their bosses do not possess. An auction may help reveal this information.

Just as prices in the economy aggregate and reveal information, so too can bidding for regulatory assignments. The prominent features of the price mechanism – transparency, comparison across providers, and continuous updating – may also foster competition among examiners. As a theoretical matter, competition for the provision of regulatory resources should be as effective and efficient as for the provision of any other resource, all else being equal. Admittedly, if social costs of behavior are not captured in the prices paid for regulation, then competition may not be welfare maximizing; this is the infamous race to the bottom. Accordingly, a crucial prerequisite to our proposed allocation model is that regulators reap some of the gains and bear some of the losses from the quality of their work.[22] If this condition obtains, as our examiner pay for performance proposal would accomplish, then bidding for assignments would reveal valuable information that examiners possess but would otherwise be unable or unwilling to provide.

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[21] To assure open and competitive bidding for contracts, government procurement relies on two different approaches, depending on the circumstances: sealed bidding and competitive negotiation. *See* Federal Acquisition Regulation, available at https://www.acquisition.gov/far/index.html. While sealed bidding relies only on price and price-related factors in awarding contracts, competitive negotiation is appropriate when it may be necessary for contracting officers to conduct discussions with offerors. *See* FAR 6.401(a). Non-cost factors may also play a role in determining which bid to accept. *See* id.

[22] *See* Henderson & Tung, "Pay for Regulator Performance," *supra* note __ at ___.

For instance, suppose Examiner 1 currently supervises activities at National Bank, but Examiner 2 believes that she is better able to bear the potential downside risk in compensation from a regulatory failure at National Bank or is better able to assess the risk at National Bank. There may be many reasons for this. Examiner 2 may have greater skill than Examiner 1, but may not be able to readily convey this to those making regulatory assignments. (Such an outcome may be especially likely in the case where assignments are made based on non-performance-related factors, such as seniority.) Or Examiner 1 may be captured, and therefore unwilling to act as aggressively as she should.[23] Or Examiner 2 may have better information about the risk posed by the activities of National Bank. In any of these situations, Examiner 2 may be able to outbid Examiner 1 for the assignment, since Examiner 2 would be able to better value the costs and benefits of the assignment. Examiner 2's low bid for the assignment reveals valuable information about the relative fit between the work to be done and Examiner 1 versus Examiner 2.[24]

In addition, the bidding may reveal private information held by the examiners as a group about the riskiness of particular banks. If individual risk aversion and individual examiner quality are relatively

[23] For example, if Examiner 1 wears rose-colored glasses about the risk of National Bank, she would underestimate the risk posed by the bank, and therefore, in the auction model we propose below, if Examiner 2 has a more realistic estimate of the risk, she would be able to outbid Examiner 1 for the work.

[24] As noted above, this model of assignment only works if Examiner 2 gains or loses depending on her ability to deliver the optimal amount of regulation. For instance, if Examiner 2 stands to lose if National Bank engages in too much risk taking, then Examiner 2 has incentives to bake these losses into the price she is willing to pay to examine National Bank. If not, that is, if Examiner 2 is able to capture gains from winning the work but put the downside onto others, then her bid would not contain valuable information about her ability to achieve the social optimum.

constant through a bidding "season," comparing the sets of bids for each bank should reflect a rough estimate of the potential downside risk of taking on the work at the various banks. Since examiners may have good information about bank riskiness but imperfect mechanisms for conveying this information to higher-ups in the regulatory agency, such a system may have the virtue of surfacing the information in more efficient ways.[25]

One way of conceptualizing our proposal is what we call "reverse regulatory arbitrage," that is, an antidote of sorts to the possibility that banks might encourage lax regulation through regulatory arbitrage. Regulatory competition in banking is not new. For many years leading up to the Financial Crisis, and even today, banks effectively choose their regulator when they decide where to obtain a banking charter.[26] Regulators in turn had an incentive to design their regulatory environments with an eye to attracting banks in order expand the scope of their regulatory authority.[27] This competition among regulators offered opportunities for banks to match their activities to the most suitably lenient regulator, thereby minimizing the

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[25] There are other ways of transmitting this information. Examiners could do it informally simply by communicating their views about the health of various banks throughout the agency. The incentives to do so may be absent some incentive, be it financial or otherwise. In fact, such behavior may be discouraged precisely because of the lack of a formal allocation system, since it may be viewed as undermining of other examiners. Alternatively, examiners could be permitted to trade in bank securities. This proposal suffers from numerous significant concerns, however, including legal ones having to do with insider trading and practical ones having to do with the fact that anonymous purchases or sales in the volumes examiners would trade are unlikely to move market prices. An internal auction system avoids these problems.

[26] *See, e.g.,* John A. Weinberg, *Competition Among Bank Regulators*, 88 FED. RES. BANK OF RICHMOND ECON. QUART. 19 (2002).

[27] *See* id.

regulatory constraints on their business models.[28] Regulation was unsuccessful in forcing banks to fully internalize the downside of their risk taking, which suggests that this competition was a race to the bottom for regulatory oversight.[29] (One reason the race among regulators was to the bottom instead of the top is because regulatory agencies did not internalize the full costs of their regulatory choices.)

Our proposal seeks to turn the tables on the banks. Instead of permitting banks to choose their regulators, we propose to let examiners choose their banks.[30] Examiners would compete for the banks they wish to supervise, and they would do so through the price mechanism. Essentially, we would auction off the supervisory rights over individual banks, so that banks would be matched with examiners who could maximize banks' regulatory value, thereby optimizing regulatory resource allocation. Assuming regulators would bear the downside of their own regulatory laxity and the upside of their regulatory efficiency—through an incentive pay scheme we have described elsewhere, for example—this race would be toward the top and not the bottom.

To make our core argument, we proceed as follows. In Part II, we describe the basic theory of resource allocation. We show how the price mechanism is an alternative to command-and-control in the area of regulatory resource deployment, and argue that the benefits of using this method may exceed the costs in a range of contexts. Part III then applies this thinking to the case of bank examiners. In this part, we propose

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[28] *See, e.g.,* Chana Joffe-Walt, "Regulating AIG: Who Fell Asleep On the Job?," NPR, June 5, 2009, available at http://www.npr.org/templates/story/story.php?storyId=104979546.

[29] *See* id.

[30] So our focus is not on competition among regulatory agencies. Instead, we propose competition among examiners within a given agency.

a price-based auction for use in assigning bank regulators to supervisor specific banks. Part IV raises and answers some potential objections, such as the revolving door problem and issues about manipulation.

II. THE THEORY OF RESOURCE ALLOCATION

Our proposal is well grounded in both theory and practice outside of the regulatory context. Over seventy years ago, Ronald Coase explained why resources are sometimes allocated by fiat—typically within a firm hierarchy—and sometimes allocated through the price mechanism—typically through market transactions.[31] Market pricing coordinates economic interaction by revealing private information, but fiat is the more efficient mechanism when the transaction costs of using prices are sufficiently large.[32] For instance, photocopying tasks for a business could perhaps be performed most efficiently if assigned through competitive bidding (either inside or outside the firm), but the costs of such an assignment system would likely swamp any gains from improved performance of the task.[33]

In this Part, we present the basic theory of resource allocation, as it applies to regulatory resources. We first contrast prototypical markets with hierarchies as mechanisms for resource allocation. We then describe the recent organizational innovation of internal market-hybrid arrangements. Firms have recently begun to experiment with customized internal market mechanisms in order to marshal markets' informational and matching advantages for organizational de-

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[31] *See* Coase, "The Nature of the Firm," *supra* note __ at ___.

[32] *See* id. Coase defined a "firm" as the locus of decisions in which this latter condition obtained.

[33] The growth of the photocopying industry outside of firms, as seen in firms like Kinkos, demonstrates that for certain assignments, the market for photocopies may be a valuable source of efficiency.

cision making. This hybrid approach best characterizes our auction proposal for examiner assignments. We then explain how regulatory resources are allocated in practice.

A. Markets v. Firms

Every organization, be it a country, a firm, a family, or an administrative agency, has to decide how to allocate its resources to achieve its goals. For human capital allocation, the choice might involve who will cut the grass, manage a new factory, or regulate a particular bank. Whether the task is large or small, complex or mundane, important or trivial, a decision must be made about who will perform the task and how she will do it.

Market allocations are made using the price mechanism. Buyers and sellers are matched at mutually beneficial terms by reducing their preferences to a single price at which they are willing to buy or sell. Although probably not common, it is not difficult to imagine families auctioning off chore assignments. More commonly, consider a business deciding which law firm should defend it in a lawsuit. The company would solicit "bids" from various firms – that is, the prices at which the firms would perform the work – and, based on price and other factors, choose a counsel.[34] The company could open the bidding up to both internal and external lawyers.

Fiat, on the other hand, works based on hierarchy.[35] Those higher up in a hierarchy make decisions about who will do what. In the family example, the head of the family simply chooses who will cut the

[34] As the law firm example suggests, such market transactions may involve negotiated agreements, in addition to the traditional continuous double-blind auctions of spot markets.

[35] The hierarchy could be created in a number of ways—by contract, custom, or social norms, for example.

grass, presumably backed up by sanctions for non-compliance, like grounding or withholding of an allowance. This is the way chores are typically allocated, and thus familial resources deployed.[36] Businesses typically use this approach for marshalling their employees to work, and some countries have even used this approach to allocate all resources within an economy. In the lawsuit example, the CEO could simply command the general counsel to represent the company in the litigation.

As Coase noted,[37] markets and hierarchies each have their costs and benefits, and we should expect the pattern of organizations' choices to reflect the net of these. When the costs of using the price mechanism exceed the benefits, we see allocations made through command-and-control structures, and vice versa.[38] For

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[36] As explored below, however, fiat-based decisions necessarily involve estimates of the costs and benefits of particular work assignments, and, knowing this, potential assignees will want to try to influence the decision by signaling something about their efficiency at doing the work. For instance, a family member who really dislikes grass cutting may complain or do a terrible job, thus trying to convey their "price" to the decision maker.

[37] Coase defines a "firm" where the locus of command and control stops and allocation via the price mechanism starts. *See* Coase, "Nature of the Firm," *supra* note __ at __. In Coase's account, if a family or firm puts out the grass-cutting work to bid, the winner of the bid, say a local landscaping business, is outside the family or firm. *See* id. For instance, Apple Computer has other companies bid for the work assembling Apple's products, rather than vertically integrating this work within Apple's command-and-control hierarchy. Decisions about who will work on the design of the latest Apple phone, however, are made by managers based on their assessment of capability, fit, interest, politics, and so on.

[38] Outside the firm, price movements direct production, which is coordinated through a series of exchange transactions on the market. Within a firm, these market transactions are eliminated and in place of the complicated market structure with exchange transactions is substituted the entrepreneur-coordinator, who directs production.

instance, if we observe that a business sources its photocopying tasks internally by fiat but sources the supply of copy paper by price, we can fairly assume that the potential efficiency gains from using a market mechanism are worth the cost in the latter case but not in the former.[39]

Markets offer high-powered incentives for actors to get their allocation decisions right. Competition among buyers or sellers offers the potential for rich rewards to skill and skill acquisition, innovation, hard work, and information acquisition. Conversely, lack of success in the competition can lead to lost business and customers. The potentially rich rewards also attract new entrants, drawing talent to areas of market need.[40] Markets also encourage individuals to produce and reveal information that might otherwise be difficult to obtain. Thomas Sowell summarizes nicely how the price mechanism can efficiently aggregate, process, and reveal valuable information held by all individuals—what F.A. Hayek called "tacit knowledge."[41] Sowell writes:

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[39] Coase's insight was to predict that the boundary of institutions, like business firms, would change over time to reflect the relative costs and benefits of fiat versus command and control. In times, industries, or situations in which hierarchy is more efficient than price, businesses or governments or agencies will expand to conduct more activity internally. When markets are more efficient, by contrast, organizations will contract the scope of their internal activities and increase their reliance on external markets. [cite] The secular trend seems to be in the direction of the use of more market mechanisms for allocating resources. Outsourcing, whether it is of janitorial services, manufacturing, legal services, or any other functions historically performed within the boundaries of a firm, is the most familiar modern example of Coase's insight and this trend.

[40] Todd. R. Zenger, Teppo Felin & Lyda Bigelow, *Theories of the Firm-Market Boundary*, 5 ACAD. MGMT. ANNALS 89, 96 (2011).

[41] *See* F. A. HAYEK, THE FATAL CONCEIT (1988).

> Knowledge is one of the scarcest of all resources and a pricing system economizes on its use by forcing those with the most knowledge of their own particular situation to make bids for goods and resources based on that knowledge, *rather than on their ability to influence other people in planning commissions, legislatures, or royal palaces.*[42]

Related to information revelation and aggregation, markets facilitate matching and sorting. Especially in labor markets, which are populated with heterogeneous buyers and sellers, matching is an important market function. "The broadcasting of information in markets provides an opportunity to make valuable comparisons across a set of alternatives, prices and possibilities, and then make matches accordingly."[43] Managers or other purchasers of complex services issue requests for proposals, while service providers bid for projects based not only on price but also on the basis of their heterogeneous skill sets, experience, reputations, and so on.

Markets may not always work well, however. Market mechanisms require accurate prices, and price discovery is a potentially costly exercise.[44] The price mechanism might also require extensive contracting. Especially in labor markets, if projects are complex, long lasting, and require specialized skills, the transaction costs of negotiating and writing these contracts may be prohibitive. In addition, some actors may pre-

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[42] THOMAS SOWELL, BASIC ECONOMICS (2007) (emphasis supplied).

[43] Teppo Felin & Todd R. Zenger, *Information Aggregation, Matching and Radical Market-Hierarchy Hybrids: Implications for the Theory of the Firm*, 9 STRATEGIC ORGANIZATION 163, 167 (2011).

[44] Most static economic models assume all individuals know all prices, but this is not a realistic assumption when considering costs of setting up a market.

fer long-term contracts for reasons beyond the costs of contracting (e.g., risk allocation), and writing multiple contracts over time may not deliver those benefits. There may also be tax or regulatory provisions that make a single fiat decision superior to multiple price-based contracts.[45]

Assignment by fiat, by contrast, has low transactions costs once a firm's hierarchy is built. At that point, the choice about who should perform a task can be as simple as choosing. Defining a task, putting it out to bid, evaluating bids, and then engaging in extensive contracting are not required, as they are in markets. To be sure, decision makers deploying a command-and-control process may invest in information about the optimal resource allocation, but decisions can be made quickly and simply. Especially when there may be few people capable of doing the work, the stakes are low, the decider has good information about the expected quality of the work, monitoring is easy, and/or incentives for good work are strong, assignment by fiat may be superior to market transactions.

On the other hand, when one or more of these conditions do not hold, market pricing may be more efficient at matching workers with particular tasks they can do well or risks they can bear well. With allocation by fiat, employees incur influence costs, hoping to win a particular assignment by winning over the boss with nonprice signals, like jawboning, making friends, persuasion, or the like. More generally, fiat-based decisions are less transparent than price-based decisions. Such decisions and their consequences may therefore enjoy less legitimacy both within and outside an organization. If a manager chooses A over B for an

[45] For instance, sales and other transaction taxes apply to some transactions considered outside of the firm, while certain employment rules apply to some transactions considered inside of the firm.

assignment in a non-market environment, B may believe that A was chosen for reasons other than efficiency, such as nepotism, bias (e.g., race, gender, class, or politics), favoritism, and so on. Whether true or not, this may undermine the legitimacy of other managerial decisions and may reduce the productivity of both A and B, as well as other workers.[46] With market allocation, workers can simply put their money where their mouth is to reveal their private information about the costs of their doing the work. So long as wealth constraints do not exist (something discussed more below), the price mechanism is unbiased. It also facilitates straightforward comparison. If designed properly, price allocation reflects the social value of the work rather than private values that decision makers maximize by using nonprice allocation criteria.

Fiat has other drawbacks as well. There are diminishing marginal returns of management efficiency. As the size of an organization and its activity levels increase, the transaction costs of fiat-based resource allocations rise. Information demands grow, as does the expertise required of decision makers. Authorities require information about both projects and all potential workers, and as the quantum of required information aggregates across a larger and larger organization, costs can rise exponentially. As Coase explained, at some point, the inefficiencies from resource allocation by fiat can be expected to equal (and then exceed) the transaction costs of using the price mechanism. At that point, we would expect to see greater resort to the price mechanism and market allocation.

[46] Similarly, in the case of a regulatory agency, without an objective metric for allocating regulatory resources, outside stakeholders—members of Congress or the general public, for example—may view the outcomes of the regulatory process as less legitimate.

B. Market-Hierarchy Hybrids

Markets and firms merely delineate the polar cases in the spectrum of choices available to those responsible for allocating scarce resources, and Coase's dichotomous view of markets versus firms has broken down in the face of organizational innovation. We observe efforts to design "internal hybrid" market mechanisms in order to reap the benefits that Coase described for markets generally, but based within hierarchical structures. Following on the success of public information markets at predicting event outcomes, firms have created highly specialized internal markets to elicit and aggregate information from employees, both to improve internal forecasting and decisionmaking and to allocate resources.

The most famous set of prediction markets is the Iowa Electronic Markets (IEM), which offers the opportunity to essentially bet on the outcomes of U.S. Presidential and Congressional elections, as well as a host of other issues of wide public interest.[47] IEM election markets are set up as futures markets, trading contracts whose payoffs depend on the outcome of future events. The original IEM election market, set up in 1988, focused on the Bush-Dukakis Presidential race, trading contracts that would pay 2-1/2 cents for each percentage point of the popular vote ultimately obtained by a given candidate in the general election.[48] Fluctuating trading prices for Bush or Dukakis contracts would therefore reflect popular sentiment about the election's outcome.

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[47] Other IEM markets include the Federal Reserve Monetary Policy Market and the 2012 Republican Nomination Market. *See* Iowa Electronic Markets, *available at* http://tippie.uiowa.edu/iem/index.cfm (last visited June 8, 2012).

[48] Justin Wolfers & Eric Zitzewitz, *Prediction Markets*, 18 J. ECON. PERSP., 107, 110 (2004).

Prediction markets like IEM have bested expert opinion in their predictive accuracy in a variety of contexts, including elections,[49] the performance of Hollywood films (both in awards and box office receipts),[50] and the winners of NFL games.[51] These successes encouraged private companies to construct their own internal prediction markets. Hewlett-Packard, an early adopter, found that employees trading in their internal prediction market generated more accurate forecasts of printer sales than the firm's bureaucracy.[52] Google runs dozens of internal markets to forecast product demand, internal performance, and industry events.[53]

In addition to predicting events, firms use internal markets to allocate resources, including labor.

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[49] *See* id. *See also* Joyce Berg, Robert Forsythe, and Forrest Nelson, "Results from a Dozen years of election Futures Markets Research," in Handbook of Experimental Economic Results. Charles Plott and Vernon Smith, eds. Amsterdam: Elsevier; Joyce Berg, Forrest Nelson, and Thomas Rietz, 2006. "Accuracy and Forecast StandardError in Prediction Markets," mimeo, University of Iowa; Joyce Berg and Thomas Rietz, "The Iowa Electronic Market: Lessons Learned and Answers Yearned," in Information Markets: A New Way of Making Decisions in the Public and Private Sectors, ed. Robert Hahn and Paul Tetlock, AEIBrookings Joint Center, Washington D.C. (2006).

[50] David Pennock, Steve Lawrence, Finnrup Nielsen and C. Lee Giles, "Extracting Collective Probabilitistic Forecasts from Web Games," in Proceedings of the Seventh ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 174-183 (2001).

[51] Emile Servan-Schreiber, Justin Wolfers, David Pennock and Brian Galebach, "Prediction Markets: Does Money Matter?" Electronic Markets, 14(3), 243-251 (2004).

[52] Kay-Yut Chen and Charles Plott, "Information Aggregation Mechanisms:Concept, Design and Implementation for a Sales Forecasting Problem," CalTech (2002).

[53] Cowgill, Wolfers & Zitzewitz_Google at 6 & tbl. 1. Google also runs "fun" markets, focusing on topics with no direct relation to its business but which might be interesting or entertaining for its employees—e.g., gas prices or the quality of Stars Wars Episode III). These fun markets may improve liquidity in the business-related markets. *Id.*

British Petroleum has used internal electronic trading to allocate carbon dioxide emission permits among business units.[54] Intel has experimented with internal markets to allocate manufacturing capacity, allowing plant managers, sales representatives and other employees to trade futures contracts for specific products.[55] Hewlett-Packard has experimented with informal internal markets for assigning workers to projects.[56] Researchers have also modeled internal allocation markets, identifying design features important to their success.[57]

"[I]nternal hybrids are fundamentally attempts to mimic, inside the hierarchy, the decentralization of decision and income rights that characterize the market in an attempt to improve the efficiency of processes of discovering, creating, and using knowledge."[58] As Coase noted, markets offer high-powered incentives to gather information and use it efficiently. Within conventional hierarchies, by contrast, information and decision making authority might not always be found in the same place. Lower-level employees typically hold specialized knowledge about their work environment that higher-ups have no way of accessing. Internal markets can help merge that knowledge with decision

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[54] Thomas W. Malone, *Bringing the Market Inside*, HARV. BUS. REV. 107 (Apr. 2004).

[55] *Id.* at 110; David McAdams & Thomas W. Malone, Internal Markets for Supply Chain Capacity Allocation 6 (MIT Sloan Working Paper 2005).

[56] Malone, *supra* note 54, at 109.

[57] Stanley Baiman, Paul Fischer, Madhav V. Rajan & Richard Saouma, *Resource Allocation Auctions within Firms*, 45 J. ACCTG. RSC. 915 (2007); McAdams & Malone, *supra* note 55; James B. Bushnell & Shmuel S. Oren, *Internal Auctions for the Efficient Sourcing of Intermediate Products*, 12 J. OPER. MGMT. 311 (1995).

[58] Nicolai J. Foss, *Selective Intervention and Internal Hybrids: Interpreting and Learning from the Rise and Decline of the Oticon Spaghetti Organization*, 14 ORG. SCI. 331, 336 (May-June 2003).

rights, as well as offering high-powered incentives to induce efficient use of that knowledge.[59]

Our auction proposal does just that. It serves to collocate information and decision rights by delegating authority to lower-level employees. In our case, bank examiners enjoy authority to influence their work assignments through their auction bids. In addition, the high-powered incentives that come with bank debt-equity portfolios assure that examiners would make efficient use of these decision rights. This complementarity between new high-powered incentives and newly assigned decision rights for examiners may result in a more efficient allocation of human capital.[60]

Before we turn to our specific proposal for auctioning examiner assignments, it is worth considering how bank examiners and other regulatory resources are currently deployed.

C. Resource Allocation in Practice

Bank examiners are assigned to supervise particular banks through the dictate of their superiors in the regulatory hierarchy,[61] based on supervisors' judgment about things like skill, fit, work ethic, knowledge, and expertise. There is much to be said for such discretionary, non-price-based determinations. Allocators may have good information about optimal allocation decisions given their personal knowledge

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[59] For a general discussion of potential applications of prediction markets in law, *see* Michael Abramowitz & M. Todd Henderson, *Prediction Markets for Corporate Governance*, 82 N.D. LAW REV. 1343 (2007).

[60] *See id.* at 337 (discussing the importance of organizational complementarities).

[61] For example, at the Office of Comptroller of the Currency, "examiners in charge for each bank have contracts for up to five years," and assignments are made by fiat. See, e.g., http://www.charlotteobserver.com/2011/07/10/2442855/financial-crisis-lands-more-bank.html

and experience, be it individual or institutional. Moreover, if examiners do not bear the costs of their socially suboptimal decisions, then putting more power in their hands to decide their work makes little sense.[62] A hierarchical system also may have clear lines of authority, which make decisions simple and accountability for mistakes (theoretically) clear.

But this depends entirely on the incentives of deciders and the quality and cost of their information. For example, when making assignments, agency heads must address complicated tradeoffs, such as the risk of capture versus experience benefits from regulators working with the same banks year after year. Though periodic rotation of examiners helps maintain objectivity and fresh eyes,[63] this benefit must be weighed against the costs of forced rotation, which include the loss of information and expertise, transition costs for examiners,[64] and the potential for any rule to be over- or under-inclusive. The optimal rotation schedule may be difficult to discern, which takes us back to the incentives of deciders. The public has almost no information about these incentives, about how the tradeoffs are managed, and about the initial allocation decisions. Our proposal attempts to optimize the tradeoff with more information, continuously, and at a bank- and examiner-specific level.

More generally, next to nothing is known about how the federal government's vast resources are deployed. Despite this dearth of information, there are good reasons to believe that resources may be allocated in inefficient ways. For instance, like nearly all fed-

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[62] For instance, it would be inadvisable to allow examiners to pick the banks they regulate if examiners choose banks based on future employment prospects with those banks. Banks might, for example, offer post-government jobs in exchange for lax oversight.

[63] *See supra* note 1 and accompanying text.

[64] It's not always convenient for them."- http://www.charlotteobserver.com/2011/07/10/2442855/financial-crisis-lands-more-bank.html

eral employees, bank regulators are paid almost exclusively with cash salaries and cannot routinely be fired. In addition, the revolving-door problem and regulatory capture are well known problems, and there is abundant evidence, both recent and historical, of regulatory failure. All of this gives reason to worry about the efficacy of resource deployment.

There is also little oversight. Administrative agencies publish budgets and some self-serving summaries of actions taken, but little else. To take just one example, during the height of the recent finance bubble, bank regulatory agencies paid over $20 million in cash bonuses to bank examiners, but we know nothing about the individual recipients, the metrics used to allocate the bonuses, or anything else about how examiners were assigned to banks.[65] Regulatory resources may be allocated in ways that are not necessarily aligned with social welfare, but we have no way of knowing.

As we discuss in the next Part, things may change if we modify the compensation scheme so that examiners bear economic consequences from their decision making. Paying examiners with the debt and equity of the banks they regulate gives examiners a stake in their own performance, causing a shift in the costs and benefits of using prices to allocate regulatory resources. Costs are reduced because examiners now have stronger incentives to accurately and judiciously bid for their supervisory assignments, given the effect of assignment on their personal wealth. At the very least, such a system would vastly increase the transparency of the regulatory resource allocation process, and this may alone be worth the costs of such a system.

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[65] *See,* Henderson & Tung, "Pay for Regulator Performance," *supra* note __ at __.

III. BIDDING FOR BANKS

In this Part, we describe what an assignment auction might look like. As implied by our earlier discussion of internal market hybrids,[66] we do not propose the auction system as a complete replacement for the current mechanism of resource allocation. Instead, we view it as a crucial allocative mechanism within an organizational framework of fiat decisionmaking, in the same way that specialized internal markets within private firms are used to allocate resources and improve decisionmaking. Prices offer valuable information that can complement nonprice mechanisms. At the same time, nonprice factors may matter, and errors or biases may mar the auction process. For example, agency heads may rightly be concerned about the winner's curse or optimism bias on the part of examiners. Or certain examiners might harbor perverse bidding incentives.[67] Internal markets, like other markets, may require market regulators.[68] Agency heads may therefore wish to retain some amount of discretion to consider nonprice factors as well as bidding outcomes, an arrangement that is a common feature of the bidding process for both government and private contracts.

More generally, the structural details of any price-based system will be crucial to its success, and agency heads and other experts are far better positioned to design and implement the system than we are. Who may bid, how the bidding runs, how the bidding interacts with compensation, what nonprice factors are relevant to assignment decisions, and so on, will need to be worked out over time. For now, we propose a basic framework for our auction mechanism, and we outline a structure for constrained discretion

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[66] *See supra* Part II.B.

[67] We discuss these possibilities in Part IV *infra*.

[68] Thomas W. Malone, THE FUTURE OF WORK 103 (2004) (discussing the organization of internal markets).

as part of the allocation process. Our specific focus is the "examiner in charge"—the senior examiner who leads the examination team at the bank. For large banks, this senior examiner is a permanent fixture at the bank. She supervises that single bank as her full-time job. She has offices and support staff at the bank, and she spends a fair part of her working life at the bank.[69]

Section A describes a critical precondition to our auction proposal—that examiners have skin in the regulatory game by holding debt and equity securities of the banks they regulate. Section B describes the mechanics of our reverse auction. Section C elaborates the advantages of our approach. Section D explains the role of supervisors' discretion in our examiner assignment scheme.

A. Necessary Condition: Skin in the Game

A prerequisite to an auction system is that examiners have skin in the regulatory game. They must enjoy some of the upside and suffer some of the downside of their good and bad regulatory decisions. Otherwise there will be little (social) gain or loss from their assignment to any particular bank, and therefore no valuable motivation behind the decision to bid for one bank assignment or the other. Without bearing the consequences from regulatory decisions, auctioning could be perverse, since examiners' bids would reflect values personal to them that would diverge from social welfare values from regulation. For instance, an examiner might prefer working with Bank A instead of Bank B because the examiner thought Bank A was less work to supervise, preferred the geographical location of Bank A, enjoyed the people or coffee at Bank A more, or any number of factors irrelevant to regulatory goals.

[69] We discuss issues of examination team microstructure in the next Part.

If such personal values would spur an examiner to outbid her competitors for the assignment, independent of the skill or fit of the examiner, then the result could be worse regulation.[70]

Researchers have recognized the crucial role of compensation schemes in determining players' preferences in internal markets.[71] In essence, the efficiency of the market depends on the design of the internal incentive system. In an earlier paper, *Pay for Regulator Performance*, we suggested a system of incentive pay for bank examiners. Independent of work assignments, but purely as an incentive device for conscientious regulation, we argued that an examiner should be paid in part with a debt-heavy portfolio of phantom debt and equity securities of the bank she regulates.[72] Holding periods for the portfolio would assure that the examiner would embrace a medium- to long-term perspective in her regulatory decision making. For example, the examiner would not be shy about exposing excessively risky practices at her bank for fear of short-term drops in the prices of the bank's securities, since any gains or losses would only be measured over a period of years. Instead, her decision making would consider the long-term interests of the bank, and indirect-

[70] This assumes that social welfare impact of regulatory assignment is taken into account somewhat in a non-auction allocation system. If it isn't, then the auction system without skin in the game might be no worse.

[71] Baiman, et al., *supra* note 57, at 916.

[72] Because the trading price of public debt is sensitive to the downside risk of its issuer, the debt portion of the examiner's portfolio would give the examiner a personal stake in curbing excessive risk taking at the bank. The smaller equity portion of the portfolio would guard against excessive risk aversion by the examiner. Henderson & Tung, "Pay for Regulator Performance," *supra* note __ at 138. The portfolio would only form a part of an examiner's annual compensation, *id.* at 135; and it would use "phantom" securities—essentially contractual rights to payment based on the gains and losses of the underlying publicly traded securities. *Id.* at 139.

ly, the public interest. With an economic stake in the eventual outcome of her regulatory decisions, the examiner would have an incentive to more actively and carefully monitor the bank for which she is responsible.

With this as a starting point—that examiner pay would vary with regulatory outcomes based on bank-specific debt-equity portfolios—our auction proposal further capitalizes on these new incentives to improve regulatory resource allocation. We use these bank debt-equity portfolios as auction currency as well as performance incentives, inducing each examiner to value her potential regulatory assignments and thereby signal her individual skills, information, and preferences with respect to each assignment. The overall result, we hope, is the improved matching of regulators to the regulated.

B. Auctioning Off Supervision Rights

The central feature of our reverse auction proposal is that for a given bank, examiners would bid by specifying the lowest-value package of that bank's debt and equity securities (the "auction portfolio") they would be willing to accept to supervise that bank. Supervisors would set the parameters of the initial auction portfolio before the auction—the debt-equity ratio of the portfolio and its starting value, for instance—and examiners would then bid by competitive discounting of this initial auction portfolio. Agencies would conduct auctions for each regulated bank, specifying the composition and value of the initial auction portfolio for each bank, as well as other auction rules.

Higher-ups might decide for a given bank that the appropriate value for the initial auction portfolio should be $100, with a debt-equity ratio of 3:1—$75 of bank debt securities and $25 of bank equity at current

market prices.[73] These details might be based on experience with other similarly situated banks, the specific details of this bank, the current economic times, or other factors. Whatever the basis, an examiner especially confident in her ability to add regulatory value to that bank would be willing to take a larger discount on the proposed $100 initial auction portfolio than other regulators because she would be better able to enhance the value of the portfolio than others. Her low bid would signal this potential for regulatory value added, and she should be assigned to supervise that bank.

Competitive discounting from the initial auction portfolio could take two forms. Examiners could either bid with real dollars ("cash bidding"), or they could bid by stating the minimum percentage of the initial auction portfolio they would accept to supervise the bank ("portfolio bidding"). With cash bidding, each examiner essentially offers to purchase the regulatory assignment, with 100 percent of the initial auction portfolio as her incentive pay package. With portfolio bidding, the winning bidder would win the assignment by accepting the smallest percentage of the initial auction portfolio as her incentive pay.

In either case, the bidding would demonstrate examiners' relative confidence in adding value to the bank through effective regulation, with the winning bid exhibiting the most promise. For instance, if a bidding examiner believed on this portfolio that her marginal regulatory contribution would be to raise the value of the firm's debt by $25 over the course of her assignment, then she would be willing to bid up to $125 in cash for the $100 portfolio of the bank's phantom capital structure. This is because the examiner would ex-

[73] Our proposal for performance pay is to pay regulators with equity in the bank holding company, for reasons discussed in Henderson & Tung, "Pay for Regulator Performance," *supra* note __ at __.

pect the value of the portfolio to be at least $125 at the end of the period. This examiner would win out over an examiner who thought that his marginal contribution was anything less than $25.

It is difficult to tell in the abstract whether portfolio or cash bidding would be superior or whether there is a general answer to the question of which is the better approach. Each approach has benefits and costs, and these are unlikely to be constant over time, across regulators, or across banks. But it may be worthwhile to sketch out potential advantages and disadvantages of the different approaches.

Portfolio bidding has one distinct advantage over cash bidding: it may avoid direct wealth effects, since it does not require examiners to pay out of pocket to bid. With a winning bid, the examiner simply agrees to take less than 100% of the initial auction portfolio as her incentive pay package. On the other hand, bidding is capped because no examiner could discount the portfolio by more than 100 percent. A potential drawback is that heavy discounting in the bidding process may leave the winning bidder with too small a portfolio to offer sufficient incentive for diligent regulation. There may be good reason therefore to cap the bidding at less than 100 percent.[74]

The pluses and minuses of cash bidding are just the mirror image of portfolio bidding. With cash bidding, the magnitude of the performance incentives built into the initial auction portfolio would not be diminished, since the winning bidder takes the regulatory assignment with the initial auction portfolio intact, undiscounted. However, because examiners would have to pay out of pocket to bid, the varying wealth of

[74] Tiebreaking rules would be required. A number of rules could be imagined, such as ties going to incumbent examiners, or agency heads could decide. On general issue of tiebreakers, *see* Adam M. Samaha, "On Law's Tiebreakers," 77 U. CHI. L. REV. 1661 (2010).

individual examiners might affect auction outcomes. Since examiner wealth is unlikely to be relevant to the efficiency of the regulatory allocation decision, large wealth effects might corrupt the allocation process.

One potential solution is to put an upper bound on the cash bidding. If the dollar values involved in an auction are small, then wealth effects are likely to be correspondingly small. But the tighter the range of bidding, the lower would be the potential for differentiation among examiners and the less expected turnover in assignments. Moreover, arbitrarily capping the bid amounts would create difficult choices when two or more examiners are willing to pay the maximum amount. With too low a cap, supervisors are left with the allocation problem they started with.[75]

A final consideration is the possibility of perverse bidding. As more fully discussed in the next Part, an examiner may pursue assignment to a specific bank for private motives unrelated to adding regulatory value to the bank.[76] For example, she may bid with an eye to the revolving door, wishing to enhance her prospects for future employment with a specific

[75] Another way to ameliorate wealth effects is with borrowing. In theory, if an examiner could demonstrate that her supervisory assignment to a particular bank were a valuable asset, lenders should be willing to finance the acquisition of the asset. However, credit markets may not work effectively in this situation. Besides valuation issues, the asset acquired with the loan proceeds must be capable of being collateralized. An examiner might have a difficult time demonstrating the source of potential value to a prospective lender. Information about the regulated bank, the regulatory options, and so forth may be confidential and highly sensitive. In fact, the regulator may be forbidden from disclosing to anyone, especially to other banks. This scenario may also create a conflict of interest: one bank lends based on the ability of examiners to better supervise another bank. Finally, if the examiner defaulted on the loan, the lender would not be able to liquidate the asset to satisfy the debt.

[76] *See infra* Part IV.B.

bank.[77] Cash bidding deters perverse bidding, while portfolio bidding may exacerbate it. Cash bidding would effect a penalty by demanding both a high cash bid in order to win the assignment, and then saddling the examiner with the full amount of the initial auction portfolio, with the attendant risk of large losses for lax regulation. With portfolio bidding, on the other hand, the perverse bidder would be willing to offer a high discount on the initial auction portfolio, because it both improves her chances of winning the assignment and reduces the potential losses from lax regulation. We discuss ways to deter perverse bidding in the next Part. To the extent it remains a problem, cash bidding would be superior to portfolio bidding, all other things being equal.

Whether bids take the form of cash or portfolio discounts, the auction would encourage research by examiners into the quality of the assets they are bidding for. We leave it to the regulatory agencies to determine the optimal auction process. Higher-ups are likely to have valuable information about specific banks, about the need for particular compensation strategies for specific banks or types of banks, experience with a range of compensation practices, and so on. This expertise should be brought to bear in designing the auction process.

C. Improved Matching

In this Section we explain the mechanics of the improved examiner matching that is the central aim of our proposal.

[77] *See id.* Other perverse bidding motivations include insider trading motivations and a desire for leisure. *Id.*

1. *Signaling Information and Skill*

Examiners may have ex ante preferences as to which bank they will oversee. They may have varying degrees of knowledge or expertise with respect to different banks. They may have different tastes for risk or other factors. Insofar as these factors vary across examiners in valuable ways from a regulatory perspective, then an auction system can help increase regulatory efficiency.[78] For example, an examiner's special expertise, experience, skill, personality, information, or risk preferences may enable her to be especially effective at regulating a particular bank. She may possess bank-specific information about business methods, management, value, risk, regulatory needs, receptiveness to regulatory oversight, and so on. To the extent her particular attributes would add regulatory value to a given bank, this should motivate her to bid aggressively for that bank, since she would share in the value she adds to the bank through her conscientious supervision. She would bid more for that bank assignment than for other available assignments, and she would bid more for that assignment than her competitors would.

Bidding can help reveal examiners' bank-specific information or skills or preferences and sort examiners accordingly.[79] If well designed, the auction process can help align bank- and examiner-specific attributes to

[78] By contrast, if each examiner was equally qualified for each regulatory assignment and stood to gain or lose the same, then the auction would be of no value, since it would not reveal anything other than auction skill or perhaps risk preferences in auctions of the various examiners.

[79] To generalize, this feature means the auction system is likely to work only when there is some specific linkage between the work done and firm-specific values. For instance, it is unlikely to work well for the regulation of clean air, but it might for patent regulation, where there may be direct measures of social gains and losses from patent decisions.

promote desired regulatory outcomes. Consider two different scenarios where the auction approach may prove useful. In the first, call it "information forcing," Examiner 1 may bid for the supervisory assignment of Bank A or Bank B. She believes strongly that Bank A is more likely to default than Bank B, even in the face of strong regulatory oversight. Based on this private information, Examiner 1 might be less willing to supervise Bank A, since she would bear some of the consequences from bank failure. Accordingly, Examiner 1 would not bid aggressively to supervise Bank A, and therefore the "price" to the agency of procuring supervision for Bank A would rise relative to Bank B.

In the second scenario, call it "skill matching," Examiner 2 is more confident of her ability to supervise Bank A and reduce its risk of default than Examiner 1. This could be because Examiner 2 believes she has better skill or better information than Examiner 1, or is less susceptible to capture, for example. Whatever the case, the auction would help incorporate these factors into the allocation process. Examiner 2 would be willing to make a lower bid than Examiner 1 to supervise Bank A, because she would capture more upside from her regulatory choices in that supervisory role.

In both cases, the price signal provides valuable information about examiners and banks. If there is reason to believe that the information generated by agency heads using a fiat model of allocation is insufficient to optimize the matching process, then an auction system may improve the process. Agency heads could be biased by personalities or politics; or they might have weak incentives to invest in the optimal matching because of their own compensation system or the weakness of reputational constraints. Examiners too might not have incentives to convey information about skill, fit, or risk tolerance to higher ups, since there is little to gain from improved matching. They also might be unable to do so effectively, since the information might be costly to convey, either be-

cause of the biases of higher ups or the complexity of the information itself.

2. Countering Incumbent Bias

Another advantage of using our portfolio-based price mechanism to assign examiners to banks is that it may help to counter the bias of incumbent examiners by facilitating their replacement.

Imagine an examiner who has worked on site for a particular bank for several years, but now has to bid on assignments every year or every few years. That examiner will likely have a significant edge over other examiners in bidding, given her likely informational advantages.[80] But if examiners enjoy the upside and bear the downside from their regulatory choices, then another examiner may be able to offer a lower bid if the current examiner were biased by familiarity or captured in some other way.

For instance, assume that Bank A has a 30 percent chance of default, but incumbent Examiner 1 underestimates the risk (believing, say, there is only a 10 percent chance) and thinks there is little she can do to reduce that risk. Examiner 2, in contrast, accurately estimates the chance of default, and believes he can reduce the risk to less than 10 percent. Because examiner pay is tied to the value of Bank A's debt (and equity) under our compensation scheme, Examiner 2 can expect to gain more than Examiner 1 in this situation from the price appreciation in Bank A's debt. Accordingly, Examiner 2 should be able to win the assignment. Examiner 2 would likely be willing to accept a lower-value (ex ante) portfolio of the bank's debt and equity securities than Examiner 1, provided Examiner 2 sees clearly the prospective gain in debt value from

[80] Of course, this advantage should be likely no more than the status quo, which, for lack of a better phrase, biases in favor of the status quo.

reduced risk at Bank A. Incumbent Examiner 1's bias, on the other hand, enables her to see only a smaller gain. She would therefore be less willing to accept an ex ante lower-value portfolio. In this way, the low bidder is likely to be the regulator best able to identify and implement gains from regulatory action.[81]

Note that this debiasing effect of our regulatory auction augments the debiasing work already being accomplished with our incentive pay structure. The debt-heavy portfolio of bank securities already helps debias incumbent Examiner 1 directly because the trading price of a bank's debt securities reflects risk taking at the bank. If Examiner 1 privately underestimates the risk of default of Bank A, the debt trading prices of Bank A should offer some corrective. Also the debt-heavy mix means that Examiner 1 has less to gain from permitting the Bank to pursue risky strategies than the CEO does. But these incentives might be insufficient if Examiner 1 does not have good information about risk or potential regulatory fixes, or is incapable of processing the information accurately. As noted above, this could be because of various biases that arise from working at a particular bank. The assignment auction offers an additional mechanism to address incumbent bias.

D. The Role of Discretion

We do not view auction outcomes as necessarily the dispositive factor in regulatory assignments. Auctions would reveal information to supervisors that would be valuable in pursuing optimal resource alloca-

[81] Note the crucial role of the debt-equity portfolio in the reverse auction mechanics. If the loss to either examiner from Bank A's default were simply a flat loss of $100, then incumbent Examiner 1 could be expected to make the lower bid, since Examiner 1 would have an expected value of default of minus $10, while Examiner 2's expected value of default would be minus $30. This would merely reinforce any bias from incumbency.

tion. At the same time, supervisors will also have their own valuable information and experience to bring to the assignment process. Some discretion is therefore appropriate. In terms of building discretion into our auction-based assignment process, the existing government procurement process offers a useful example.

1. Negotiated Procurement

In conventional government contracting, negotiated procurement is preferable to sealed bidding when it may be necessary to conduct discussions with bidders or assignments may turn on non-price considerations.[82] Examiner assignment seems analogous. Given the familiarity among examiners and their supervisors, it would seem odd to rely solely on examiner bids with no further communication relating to assignments. Similarly, given supervisors' knowledge and experience with their examiners, non-price considerations might plausibly be part of the assignment process.

Because a more discretionary approach may lead to undesired favoritism, existing procurement regulations include a number of safeguards, some form of which may also be suitable for examiner assignments. Negotiated procurement proceeds in stages that are transparent to all the bidders.[83] The initial Request for Proposals (RFP) explains the agency's need, the anticipated terms and conditions of the contract, information that the bidder must include in a proposal, and the factors that will be used to evaluate the proposals and award the contract. The contracting officer evaluates bids based not only on price, but also on each bidder's past contract performance and its

[82] The extensive rules for government auctions, known as Federal Acquisition Regulation (FAR), can be fond here: https://www.acquisition.gov/far/current/pdf/FAR.pdf.

[83] For example, excluded bidders are notified of their exclusion. *See* id.

proposed technical approach to the project at issue. She then identifies the best proposals for further discussion.

"Discussion" is hardly a casual affair in negotiated procurement.[84] Instead, it is subject to a number of regulatory constraints to assure it is not used to favor one bidder over another.[85] The stated purpose of discussion is to maximize the best value for the government, and toward that end, to give bidders an opportunity to revise their bids to be more competitive. Discussion must be "meaningful." The agency "shall . . . indicate to . . . each offeror still being considered for award, significant weaknesses, deficiencies, and other aspects of its proposal . . . that could, in the opinion of the contracting officer, be altered or explained to enhance materially the proposal's potential for award."[86]

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[84] As the Federal Acquisition Regulation explains:

> Negotiations are exchanges, in either a competitive or sole source environment, between the Government and offerors, that are undertaken with the intent of allowing the offeror to revise its proposal. These negotiations may include bargaining. Bargaining includes persuasion, alteration of assumptions and positions, give-and-take, and may apply to price, schedule, technical requirements, type of contract, or other terms of a proposed contract. When negotiations are conducted in a competitive acquisition, they take place after establishment of the competitive range and are called discussions.

See id.

[85] The contracting officer may not (1) engage in conduct that favors one offeror over another; (2) reveal an offeror's technical solution; (3) reveal an offeror's price without permission; (4) disclose the names of persons providing information about the offeror's past performance; or (5) furnish sensitive source selection information. *See* FAR § 15.306(e).

[86] *See* id. While each bidder's pricing information is confidential, the agency can inform a bidder that its offer is too high or too low and explain how the agency came to that conclusion. The agency may also inform all bidders that it has determined a particular price to be reasonable, and the basis for that analysis.

Following discussions, each bidder may submit a final revised offer.

Finally, once the winning bid is selected, the contracting officer must document the decision, analyzing the trade-offs accomplished by the discussions and identifying the reasons why the winning bid was the most advantageous to the agency.[87]

2. Application to Examiner Assignment

A similar transparent negotiation process could work for examiner assignments as well.[88] Along with setting each bank's initial auction portfolio, supervisors could generate a written description of the specific features of each regulatory assignment, including the nature of the bank's lending and other activities, the appropriate type and level of experience for examiner-bidders, the expected size of the examination team that would supervise the bank, and so on. After culling the most promising bids, supervisors could engage in discussion with bidders in order to assist each bidder in making her most competitive bid. As with outside procurement, documentation of the choice of examiner for each bank would operate as an important check on favoritism and also make clear the agency's priorities with respect to examiner assignments.

Government procurement may not be the perfect model for examiner assignment auctions, since procurement involves pure outsourcing. Examiners and their supervisors likely have far better information about each other and the bank supervisory assignments at issue than contracting officers and outside

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[87] *See* id.

[88] We are not suggesting this process is perfect. There are many criticisms of government procurement, and the process has evolved over time in response to experience and learning. An auction system for regulatory assignments should take account of these lessons and adapt them to the particular context.

bidders have about each other or the work up for bid. So a more streamlined process for examiner assignments may be appropriate. Also given bank confidentiality issues, transparency of the assignment process should not extend to the public at large without procedures in place to address this concern. However, transparency within the regulatory agencies would still be important for assuring fair and impartial assignments. Familiarity among supervisors and examiners might otherwise breed favoritism, and the entire point of the auction process would be frustrated.

Although we think the experience with government procurement suggests a role for the discretionary consideration of non-price factors in examiner assignment auctions, this increases the risk that factors unrelated to regulatory efficiency could be introduced. There is no a priori way to address this issue. Agencies will need to be sensitive to it as they implement an auction system. Given the uncertainties, we suggest a series of small-scale experiments, perhaps running simulations or starting with just a few banks and a few top examiners. The learning from these preliminary trials could be used to develop a broader auction system.

Finally, banks come in all shapes, sizes, and levels of importance from a regulatory perspective. Accordingly, different auction mechanisms may be appropriate depending on a particular bank's characteristics. Large, important banks, known as systemically important financial institutions (SIFIs), might warrant a much different and more complicated auction process than local community banks. A risk-based auction design system might also make some sense.

IV. QUALIFICATIONS AND OBJECTIONS

This Part offers some qualifications and addresses potential objections to our proposal. As we have noted elsewhere, we are confident that there are

many more details to be worked out by agency heads and others within the regulatory agencies. Our goal is merely to address the most significant potential obstacles in order to show that our auction approach is worth serious consideration.

A. Biases in Bidding and Beyond

Though we earlier detailed certain biases that could impede effective fiat decision making within organizational hierarchies, auctions are not free of bias either. Our move to a market mechanism simply moves potential bias or decision-making problems from the boss to the employee—from the decider (in a fiat model) to the bidder (in a market model). For example, a bidder may be overly confident about her ability or fit, such that her winning bid may be too low. Her mistaken self-assessment may thus result in suboptimal assignments.[89]

Studies of actual internal prediction markets identify potential biases that might also affect our assignment auction.[90] Google's internal prediction markets show evidence of optimism bias among those employees trading: traded contracts tied to optimistic

[89] Note that this bias of a single bidder would likely affect a number of matches, and not just the biased bidder's assignment.

[90] Though internal prediction markets are different in important respects from our regulatory resource allocation auction, there may still be useful lessons in analyzing the performance of these prediction markets. Internal prediction markets are typically structured as continuous double-blind auctions, like spot markets. Our auction, by contrast, would occur only periodically; there would be no continuous trading of regulatory assignments. Also prediction markets typically trade contracts whose ultimate payoff is not affected by the behavior of the bidders. Our auction by contrast is designed to induce certain behavior by a winning bidder by having the payoffs from her contract vary with her regulatory performance. We keep these differences in mind as we attempt to translate findings from internal prediction market studies to our auction context.

outcomes were overpriced by ten percentage points.[91] Newer Google employees were the most susceptible, overbidding in reaction to upward trends in Google's stock price; employees with more experience on the job and more trading experience were less susceptible to this bias.[92]

One can easily imagine a similar bias affecting examiner assignment auctions. An inexperienced examiner might overestimate both her abilities and the possibilities for value-increasing regulatory changes at particular banks. These misestimations would cause the examiner to underbid, perhaps allowing her to win an assignment but one that might not be an optimal match.

Prediction markets also exhibit the long-shot bias, overpricing extremely unlikely outcomes.[93] Again, one could imagine an examiner—especially a less experienced one—overvaluing the bleak turnaround prospects for a shaky bank and therefore underbidding to win the assignment.

Having staked her claim to a particular regulatory assignment through aggressive bidding, an examiner may compound her biases in her approach to supervision. Say, for example, that an examiner wins an assignment through a bidding strategy based on her overly optimistic pre-auction assessment of the potential for value-increasing regulatory changes at a given bank. Having won the assignment, the examiner may feel committed to that view of the bank, which may affect her regulatory choices going forward. Now invested in her value-increasing regulatory strategy—which might involve more or less aggressive oversight—she may credit information that affirms her earlier assessment, but she may reject disconfirming information. This phenomenon of escalating commitment is

[91] Cowgill, Wolfers & Zitzewitz at 1.
[92] See id. at __.
[93] Wolfers & Zitzewitz at 117.

well understood by social psychologists and organizational behaviorists.[94] Though it could plausibly affect examiners even under the current system—examiners commit to regulatory strategies regardless of the assignment mechanism—it may be especially worrisome in the auction context, where the examiner has essentially made a financial investment in her regulatory assignment through a competitive process. The auction might cause her to make a stronger and earlier commitment to her regulatory strategy than she would under the status quo.

Regulatory agencies and other buyers of labor have ways to reduce these problems, however, as a rich auction design literature describes,[95] and as existing internal market arrangements illustrate.[96] That these problems are known is a first step toward ameliorating their costs. Biases can be identified from the data and monitored, and auctions and other features of work can be adjusted to reduce them. For instance, by keeping data about bidding and performance, higher-ups can identify any systematic pathologies of the bidding process, and tweak the auction design to remedy them. Moreover, the agency could rely on its own information to help make corrections. For instance, if agency heads (who would otherwise have allocative authority) have information suggesting flaws in particular bids, there is no reason for them to ignore this information. Government contracting operates this way. Outsourced functions do not necessarily go to the low-

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[94] *See* Barry M. Staw, *The Escalation of Commitment to a Course of Action*, 6 ACAD. MGMT. REV. 577 (1981).

[95] *See, e.g.,* PAUL KLEMPERER, ED. THE ECONOMIC THEORY OF AUCTIONS (1999); PAUL KLEMPERER, AUCTIONS: THEORY AND PRACTICE (2004); VIJAY KRISHNA, AUCTION THEORY (2002); J. Riley & W. Samuelson, "Optimal auctions," 71 AM. ECON. REV. 381 (1981); P. Milgrom and R. Weber, "A Theory of Auctions and Competitive Bidding," 50 ECONOMETRICA 1089 (1982).

[96] *See, e.g.,* Michael Abramowitz & M. Todd Henderson, *supra* note __ at __.

est bidder, especially if there is evidence of error in the bid – say, it is way too low given the available information about the bidder. Viewed this way, internal auctions are merely a way of broadening the range of potential outcomes that would be made by a fiat system.

In any event, the potential problem is unlikely to be systematic: after the overconfident employee realizes losses on the project she underbid, she is less likely to persist in the biased belief that caused the errant bid.

B. Perverse Bidding Motivations

So far, the only bidding motivation we have considered is the examiner's potential to add regulatory value to banks. If pay-for-performance algorithms are well designed (that is, effective at identifying the public interest and inducing examiners to pursue it), and examiners are motivated to maximize their payouts under the algorithms, then a well-designed auction can help elicit private information about regulatory efficiency. But an auction might also give examiners opportunities to pursue interests other than the public interest.

In this Section, we discuss possible harmful motivations for bidding, and we offer some ideas about mitigation. An examiner might bid for an assignment to enhance her prospects for future employment with her regulated bank; to enhance her income by trading on inside information about her supervised bank; or to accrue other benefits, such as leisure from supervising a low-risk bank. Or examiners might collude to avoid having to compete for assignments.

Each of these problems is endemic to any system of regulatory resource allocation; it does not originate with our auction proposal. The potential to manipulate regulation to serve private interests is already a serious concern. By eliciting additional information

from examiners (individually and as a group) on the potential costs and benefits of various regulatory assignments, our auction proposal can supplement existing mechanisms that deal with these issues.

1. Bidding for the Revolving Door

The revolving door may offer a significant source of future income for an examiner. A particular bank, for example, may develop a reputation for its generosity to its bank examiners with respect to post-government employment opportunities. With assignment auctions, a bank might even actively encourage this perception in order to attract friendly examiners. In this scenario, the bank essentially perverts the auction process, utilizing it to screen for lenient examiners.

Even absent opportunistic plotting by banks, situations may arise in which potential revolving-door benefits swamp any regulatory value that examiners could add to banks through conscientious and innovative regulation. One can imagine, even absent any manipulation of the process, that the revolving door problem gets worse the longer an examiner supervises the same bank. The bankers get to know the examiner and vice versa; familiarity leads to implicit or explicit promises of quid pro quos (future employment for current lax oversight). At some point, the examiner's desire to protect her investment in her revolving-door future may trump other considerations, such that her winning bid may bear no relation to her ability to add regulatory value. Her revolving-door exit may be worth more to her than any other examiner's ability to add regulatory value to the bank. These revolving door effects offer a new flavor of race-to-the-bottom regulatory competition.

There are ways of reducing these problems, however. Most obviously, examiners' incentive pay should provide a natural corrective. If the examiner

bears the consequences of her own lax regulation, then the aggregate costs of her revolving door bidding strategy would increase. The downside of quid pro quo laxity is currently very low; performance pay increases the downside, while regular bidding for assignments subjects this perverse bidding strategy to continuing external constraint.

Systematically beating the system through revolving-door bidding strikes us as unlikely and, in any event, relatively easy for higher-up regulators to detect and address. Should revolving-door problems increase, the variable pay component could be increased, vesting periods could be lengthened, or auction factors changed.

Supervisors could exercise their discretion in the assignment process even more finely. Auctions can bring new information to examiner rotation decisions, for example and facilitate tailoring by individual bank or examiner. Under the current system of mandatory rotation, a five-year "term limit" with any given bank reduces examiner entrenchment (and thus capture).[97] But trade offs between entrenchment on the one hand and expertise and experience on the other might call for shortening of the assignment term in the case of a specific bank-examiner pair. For example, scrutiny of an incumbent examiner's string of consecutive winning bids for the same bank assignment over several years might offer clues about her bidding motivations. If her winning bids appear "irrational,"—i.e., she seems to be losing money every year overbidding for her favorite assignment—then something might be amiss. Perhaps her bids make sense only when the value of her revolving-door exit is included in the calculus.[98]

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[97] *See supra* note __.

[98] Other less sinister explanations are also possible. Perhaps the incumbent values leisure extremely highly, and each year her increasing experience and familiarity with the operations of a safe

(continued next page)

Term limit intervention might be appropriate to that individual case.

Less direct interventions are also possible. Auction bidding could be structured to produce higher turnover rates if desired. For example, a bounty could be paid for outbidding an incumbent examiner for an assignment. This might be necessary to offset the costs of overcoming the incumbent's information advantages with respect to the particular bank. A bounty amount could be set such that, adjusted by the probability of the non-incumbent's winning of the assignment, it would offset the non-incumbent's investigation costs.[99] Bounty levels could be fine-tuned to reflect increasing incumbency advantages expected over time. Informational asymmetries will be lower for incumbents with only one year at a bank compared with five years, for example. Bounty levels to induce optimal research incentives should be adjusted accordingly.

More stringent constraints on post-government employment could also help. A simple reform would be to ban examiners from ever working for banks that they have regulated. Another option, either as a compliment or a substitute to a bank-specific ban, would be to require a waiting period before an examiner is permitted to work for any bank. The delay would reduce the present value of revolving door rewards and therefore deter the revolving-door problem on the margin. Reducing revolving door rewards, however—through any of the mechanisms described here—may may require agencies to increase examiner compensation to attract the same talent, since such constraints would reduce the overall payoff from being a regulator.

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bank assure her a relatively uneventful assignment with her favored bank.

[99] For instance, if an examiner gets $10,000 for winning a new assignment, and an examiner believes she has a 20% chance of doing so for a particular bank, she would rationally devote up to $2000 in resources to develop her bid.

But again, this issue is not specific to auctions as an assignment mechanism. Revolving door problems exist regardless of the assignment method; they are inherent in any regulatory environment.

Auctions offer a number of promising approaches to addressing entrenchment, and with a term limit in place, auctions should do no worse than the current assignment system, and may likely do better.

2. Bidding for Inside Information

Because examiners have access to private information about the banks they supervise, an auction system for regulatory assignments coupled with compensation in the form of bank securities may offer temptations toward insider trading or other misuse of nonpublic information.

Though portfolio compensation under our proposal would be in the form of phantom securities that could not be sold in securities markets, examiners given specific stakes in the market movements of their banks' securities might find other ways to profit from inside information. They might simply leak nonpublic information at opportune times in anticipation of cashing out a tranche of phantom securities. Or they might sell information to others who trade. But, as with the revolving-door problem noted above, this is not a problem specific to allocation mechanisms. In addition, work rules already exist to constrain this type of garden-variety insider trading. To the extent that our use of phantom securities may marginally exacerbate this problem, agencies may wish to augment their preventive efforts or increase the penalties for violations.[100]

[100] For instance, examiners paid in part in phantom securities might pay more attention to bank stock and debt prices than they do now. This saliency might then tempt them to engage in insider trading of actual bank securities.

Auctioning off work assignments offers additional nefarious possibilities. Various types of sophisticated investors might desire inside information about a particular bank. Besides those looking for a trading advantage, potential acquirers or targets of the bank or parties involved in other major transactions with the bank may seek nonpublic information about the bank. These parties might be willing to finance an examiner's bid for supervisory rights over the given bank in order to gain access to information. Although some version of this may be possible already—third parties could try to influence examiner appointments or simply approach existing examiners—auctions may offer a more direct and less easily detected method of influencing examiner assignments for shady purposes.

To some extent, a negotiated bidding process could deter this species of perverse bidding.[101] Not only do supervisors already know senior examiners personally, they could test the bona fides of examiner bids during the negotiation process. In addition, higher ups could more closely monitor newly auction-assigned examiners ex post for evidence of illicit motives inimical to improved regulatory outcomes. Existing sanctions for revealing confidential bank information could be increased. Whether the additional costs of this monitoring and enforcement outweigh the benefits from more efficient matching of examiners with banks is an empirical question which only experience can settle. We see no apriori reason to expect that these auction-related costs should necessarily swamp the benefits.

3. Bidding for Other Private Values

Another species of private value is what me might broadly call "leisure." Certain regulatory assignments might be viewed as easier or cushier than others. If true, we would expect these to attract exam-

[101] *See supra* Part III.D.

iners with a preference for leisure or other characteristics of a particular bank. Although this might seem like an odd factor for regulatory higher ups to consider in allocating resources, there are good reasons why they should. Assuming examiners have heterogeneous preferences for leisure or various types of risk, allowing examiners to price these preferences should improve regulatory outcomes. Harder working, risk-preferring examiners will be more likely to win assignments where those preferences will be valued, while more easy going, risk-averse examiners will sort to banks where those attributes are valued. It is important to reiterate here the work that compensation contracts do, since examiners of all sorts will bear the downside risks of their work. So long as this is true, then sorting should be more or less efficient. Unless these preferences can be transmitted efficiently in a bureaucratic structure that allocates talent by fiat, auctions will improve the efficiency of assignments by creating a market for talent allocation.

An analogy can be found in the market for corporate executives. Executive compensation contracts more or less reward executives for performance. The result is that risk-preferring executives should tend to work for high-risk companies, like technology start ups or other volatile companies, while risk-averse executives should take jobs at utilities or other regulated industries with greater opportunities to satisfy preferences for leisure or other non-monetary forms of utility. This helps ensure a match of talent with needs.

4. Collusive Bidding

Examiners are likely to know at least some of their fellow examiners quite well, and will be familiar with their backgrounds, experience, professional strengths, and personal preferences. This environment of familiarity may facilitate tacit or explicit collusion in bidding. Besides simply knowing one another, examin-

ers can expect to be repeat players in the periodic assignment auctions. Simple game theory tells us that these repeat plays facilitate cooperation by offering players opportunities to reward each other for past cooperation or punishing one other for defecting from prior understandings.[102]For example, examiners might agree among themselves as to bank assignments, but then offer token auction bidding to camouflage the conspiracy. In the absence of competitive bidding, examiners as a group would likely do better overall than if they competed for assignments.[103]

Of course, the wider is the conspiracy, the more difficult it is to coordinate ex ante or enforce ex post. So an ambitious collusion scheme would likely fall of its own weight. And a conspiracy involving just a few examiners would likely be ineffective at altering auction outcomes. Moreover, collusion is also possible when regulatory resources are allocated by fiat. Depending on the size and probability of obtaining favors from the regulated, the stakes may be just as high.

Supervisors would have several possible strategies to fight collusion. These can be found in the policies and procedures of the Antitrust Division at the Department of Justice, which polices commercial markets for anti-competitive behavior. Banking regulators could offer rewards for whistleblowers, conduct random audits of bidding processes, impose large penalties (e.g., from termination to civil and criminal penalties) for those caught colluding, and so on. The specific approaches to policing our examiner assignment auc-

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[102] For a general discussion of the problems and potential cures for collusion in auctions, *see* Yoram Bachrach, et al., "A Cooperative Approach to Collusion in Auctions," 10 ACM SIGECOM EXCHANGES 17 (2011).

[103] A mismatch of examiners to banks would mean worse performance of banks' debt-equity portfolios overall, but each examiner's portfolio would be larger without competitive bidding. Assuming the latter dynamic dominated the former, then examiners as a group would benefit from collusion.

tion are best left to the agencies and the experts at the DOJ. A key point is that the potential for collusive behavior is likely no worse than in many commercial markets, where the potential for collusion is insufficient to recommend fiat allocation of the resources at issue.

C. Examination Team Microstructure

For simplicity, our proposal focuses on the examiner in charge, but for larger banks, the examination process involves a team of examiners working under the examiner in charge. For these examination teams, assignment decisions at the level below the head examiner may matter a great deal, since the examiner in charge will have an imperfect ability to motivate and monitor examiners working on the team. Examiner teams are undoubtedly greater than the sum of their parts. Examiners on a team need to work together, sometimes in high-pressure situations, so intangible factors—"chemistry"—will matter a great deal.

A simple but naïve approach would be to just extend our incentive compensation scheme and our allocation approach down the hierarchy. That is, senior and junior examiners could all be independently assigned to bank teams through the auction mechanism. But given the importance of team chemistry, this approach would be less than ideal. The examiner in charge may reasonably expect some input into the composition of her team.

There are better alternatives. Examination teams without a lead examiner could be assigned by fiat by agency higher ups, and then potential examiners in charge could bid for a particular bank/examination team combination. The pre-auction team assignments could be made by experience, fit, random draw, or a mix of factors, just as they are today.

Alternatively, lower-level examiners could bid for assignments after examiners-in-charge had been as-

signed to banks. So the lower-level examiners would be bidding for lead examiner/bank combinations. And examiners in charge and/or regulatory higher-ups could exercise some discretion in tailoring teams, based in part on these auction results. However assigned, the approach would ideally incentivize individual examiners and generate suitable matches without impeding the lead examiner's ability to manage the examination team.

Numerous mixed strategies could be employed on an experimental basis to determine the optimal approach. For example, some teams could be assigned independent of the lead examiners, some could be chosen after a lead-examiner auction, and so on. We do not have special wisdom on which of these strategies would be most successful at producing high-quality examination teams. We are confident that efficient and effective strategies may emerge with judicious experimentation.

D. Why It Has Not Happened Yet

If this is such a sensible idea, one might ask, why has it never been tried? One possible explanation relates to a precondition we described earlier: bidders must have skin in the game.[104] An auction system can work only if examiners bear the costs and capture the gains from the regulatory assignments they are bidding on. Since they are not currently paid for performance, this may explain the lack of experimentation with market-based allocation mechanisms. Without some skin the game for examiners, bidding for regulatory assignments would not be useful and could be counterproductive.

Skin in the game does not necessarily have to involve direct financial rewards, however. Insofar as examiners and other regulators gain or lose reputation

[104] *See supra* Part III.A.

as a result of their performance, an auction could capitalize on this reputational stake and improve regulatory assignments. The absence of such experimentation may therefore indicate the low intensity of these nonmonetary incentives or other factors. For instance, agency heads may not have sufficiently strong reputational incentives to pursue optimal regulation. Or agency heads may also be risk averse. A failed auction system may cost them a great deal in terms of employee relations, their political fortunes, or other reputational factors. Even if a successful reform offered symmetrical rewards, such rewards would have to be discounted by the ex ante likelihood of failure. More generally, any social gains would be widely dispersed. In short, incentives to innovate may be lacking.

E. Thinking Beyond the Agency

Assuming these various potential pitfalls can be overcome, it becomes possible to imagine expanding the auction beyond existing examiners within a particular federal agency and the banks supervised by that agency.[105] One can envision a broader assignment auction to encompass banks and bank examiners across the various federal bank regulatory agencies. This could improve regulation because thicker markets generally promote better matching. More banks and examiners in the auction pool allow for finer tailoring of examiner skill and experience to bank supervisory needs.[106]

Though one might initially see historical assignment patterns replicated in the auction process

[105] The OCC supervises national banks; the Federal Reserve supervises state member banks and bank holding companies; and the FDIC supervises state nonmember banks and FDIC-insured savings banks. FED. DEPOSIT INSURANCE CORP., AN EXAMINATION OF THE BANKING CRISES OF THE 1980S AND EARLY 1990S 24 (2000).

[106] *See* ENRICO MORETTI, THE NEW GEOGRAPHY OF JOBS (2012).

across multiple agencies, one could imagine that over time, individual examiners might develop expertise relating to banks not traditionally within their agencies' purview in order to take advantage of the broader range of regulatory assignments available.

The next incremental expansion of the regulatory assigment market might even include other financial regulators within the federal government or within the broader range of quasi-public regulators, such as the various self-regulatory organizations, or even further to new potential regulatory startups. For instance, examiners at Finra,[107] which regulates broker-dealers, could bid for bank examination work if Finra and its examiners believed that Finra examiners (of broker-dealers) could do a better job than current banking examiners.[108]

As the pool of potential regulatory bidders were expanded this way, we would expect the outsourcing agency to impose bidding requirements. Sensible requirements would include minimum amounts of training or experience, bonding, or other rules designed to reduce expected decision and error costs. These requirements should be considered carefully, however, since they could be used to distort auction outcomes to favor incumbent examiners.

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[107] FINRA is the Financial Industry Regulatory Authority.

[108] In fact, as of this writing, Finra is lobbying Congress to give it regulatory authority over "investment advisors" under the Investment Advisors Act of 1940. Instead of any Congressional mandate, the job could be put out to bid. Insofar as Finra, or any other bidder, could be assured of bearing the upside and downside of its regulatory choices, then this might be a better way of allocating the assignment. Although ensuring internalization of costs and benefits may be more difficult for a regulatory agency than for individual examiners, it is based on something like this assumption that Finra, as a privately owned company, is currently permitted to regulate broker-dealers under the Securities Exchange Act of 1934.

On the other hand, there may be good reasons to bias the auction-assignment process in favor of existing agency examiners. For one, including extra-agency examiners in the bidders' pool would increase the cost of using the price mechanism compared with fiat. In addition, the broader is the range of individuals or entities engaged in the bidding, the greater is the potential for errors. This cost is reduced if the optimal compensation contract can be written, causing the parties to fully internalize the costs of their decisions. We would expect that the more refined the compensation contract for examiner services becomes over time, the lower the costs of expanding the range of potential examiners. In any event, incremental expansions could be implemented as we describe, with each stage of expansion subject to evaluation of its new cost-benefit calculus.

V. CONCLUSION

Regulatory agencies across the government currently deploy their vast resources based on a command-and-control model. Agency heads direct particular government employees to do particular work. While the assignments are no doubt influenced by the input of those who will do the work, as well as assessments by their superiors, this process could be improved by creating a market in which assignments are allocated using the price mechanism. If regulators reap the benefits of good work and bear the costs of bad work, then they can convey information about themselves, their fit with particular assignments, and the quality of regulated entities more efficiently through a market than they can by lobbying or jawboning agency heads.

In this paper, we propose auctions for the allocation of bank examiners to particular banks. Building off our earlier work proposing performance pay for bankers, we show how auctions can improve regulatory effi-

ciency by improving the initial allocation of examiners and combating capture and entrenchment.

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