Exclusive Dealing in European Central Banking and Prostitution

The code of conduct of the Dutch central bank forbids "indecent behaviour and says no employee should act in a way which could lead to negative publicity.

One of its managers, 46-year-old Conchita van der Waal was fired for advertising herself for "kinky sex" dressed as an SS Commandant.

See "Woman fired for being a prostitute by Dutch central bank: Employee said to have charged €450 an hour as prostitute specialising in sadomasochism."

She also was charged with violation of zoning laws by her use of her apartment.

Why Use Requirement Contracts?
The Tradeoff between Hold Up and Breach

June 20, 2015

Eric Rasmusen

A requirements contract is a form of exclusive dealing in which the buyer promises to buy only from one seller if he buys at all. This paper models a most common-sense motivation for such contracts: that the buyer wants to ensure a reliable supply at a pre-arranged price without any need for renegotiation or efficient breach. This requires that the buyer be unsure of his future demand, that a seller invest in capacity specific to the buyer, and that the transaction costs of revising or enforcing contracts be high. Transaction costs are key, because without them a better outcome can be obtained with a fixed-quantity contract. The fixed-quantity contract, however, requires breach and damages. If transaction costs make this too costly, an option contract does better. A requirements contract has the further advantage that it evens out the profits of the seller across states of the world and thus allows for an average price closer to marginal cost.

Eric Rasmusen: John M. Olin Faculty Fellow, Olin Center, Harvard Law School; Visiting Professor, Economics Dept., Harvard University, Cambridge, Massachusetts (till July 1, 2015). Dan R. and Catherine M. Dalton Professor, Department of Business Economics and Public Policy, Kelley School of Business, Indiana University, Bloomington Indiana. This paper: http://www.rasmusen.org/papers/holdup-rasmusen.pdf.

The TeethcleaningCase

Jullie G. Horn v. United States, United States Court of Federal Claims (2011), was a lawsuit over a 2005 contract between Jullie Horn and the Federal Bureau of Prisons. Horn was awarded a contract to provide professional dental hygiene services under the direction of the Dentist to the inmate population at the United States Penitentiary and Federal Prison Camp, Marion, Illinois. The contract specified that she was to provide a maximum of 1,560 one-hour dental hygiene sessions at a price of $32 per session.

Horn's Contract

The contract was labelled **a "REQUIREMENTS" contract** in capital letters. It said,

(a) This is a requirements contract for the supplies or services specified, and effective for the period stated, in the Schedule. The quantities of supplies or services specified in the Schedule are estimates only and are not purchased by this contract. Except as this contract may otherwise provide, if the Governments requirements do not result in orders in the quantities described as "estimated or "maximum in the Schedule, that fact shall not constitute the basis for an equitable price adjustment.

(c) The estimated quantities are not the total requirements of the Government activity specified in the Schedule, but are estimates of requirements in excess of the quantities that the activity itself furnish within its own capabilities. Except as this contract otherwise provides, the Government shall order from the Contractor all of that activity's requirements for supplies and services specified in the schedule that exceed the quantities that the activity may itself furnish within its own capabilities.

The Lawsuit

One month later, after Horn had completed and been paid for 130 tooth-cleaning sessions, the dentist told her that he had hired an in-house hygienist and her services were no longer needed. She sued for breach of contract on the grounds that she had been awarded all of the prison's tooth-cleaning requirements.

Why This Contract Form? Why was there a contract at all, rather than hiring the hygienist session by session? Why wasn't the quantity pinned down precisely in the contract? Why was the contract exclusive rather than at the government's option? Note, too, that there was no attempt to use nonlinear pricing, that is, to set different per-hour prices for different quantities of hours. And there were no lump-sum transfers. The government could have used a contract in which Horn paid a lump sum to obtain the contract and then received a very large

Reasons for the Contract

The government wanted some kind of contract so it could be assured of supply at a low price rather than be faced later with no seller or with just one seller who could charge a monopoly price. A fixed-quantity contract would have required renegotiation later, since the goverment did not know its own future demand precisely. Renegotiation would take up management time and be subject to corruption. An option contract would not need renegotiation but it would need high prices to compensate for the hygienist's risk that the government would switch to buying from someone else. A requirements contract did not have these disadvantages. It does not require renegotiation, and the price that yields zero economic profit to the hygienist could be lower because with outside supply ruled out, she could expect a higher quantity of her services to be demanded.

A Unit Demand Model with a Specialized Product

The buyer's value for the single unit he might buy of the good is v, unknown at the time of contracting and distributed by $F(v)$ on the support $[0, \overline{v}]$, with density $F'(v) \equiv f(v)$, where $f > 0$ and $-2f(v) - (v-c)f'(v) < 0$ so that a higher price is always more profitable up to the reservation price of $\overline{v}$.

With probability θ, the buyer needs a specialized version of the product and the normal product is worth 0 to him. He will then be in a "thin" market with few or no sellers. With probability $(1-\theta)$, the buyer, like other potential buyers, is indifferent between the specialized and the normal product.

The Supply Side

The good's marginal cost is c and many firms can produce the normal version.

A firm may try to design the specialized product by investing I, and will succeed with probability $g(I)$, where $g(0) = 0, g'(0) = \infty, g' > 0, g'' < 0$ for $I < \overline{I}$ and $g(\overline{I}) = 1$.

Under these assumptions, a firm must invest a positive amount to have a positive chance of success, the marginal product of investment starts equal to infinity, and success is certain if enough is invested.

Assume that if two firms spend I_1 and I_2 with $I_1 < I_2$, firm 2 is successful whenever firm 1 is successful. Thus, success depends on the product, not the individual attributes of the firm, and it is not independent across firms. "Design" here does not mean innovation, just the setting up of a specialized version of the standard product, which can always be done with enough time and trouble.

The First Best: Vertical Integration

The first best maximizes the sum of the negative investment costs, the surplus over marginal cost when the specialized product is needed and successfully produced, and the surplus when the specialized product is not needed. This is the surplus that would be achieved by vertical integration, if the buyer could make the investment and produce the product himself. We will denote this first-best investment as I^{**}.

$$Surplus(I) = \theta g(I) \int_c^{\overline{v}} (v-c)f(v)dv + (1-\theta) \int_c^{\overline{v}} (v-c)f(v)dv - I \qquad (1)$$

$$Surplus'(I) = -1 + g'(I^{**})\theta \int_c^{\overline{v}} (v-c)f(v)dv = 0. \qquad (2)$$

The Decentralized Optimum: P = AC

The seller makes losses and will not participate if the price equals marginal cost.

In the "decentralized optimum", the seller's profit must be raised to zero by raising the price high enough to cover the fixed cost of investment, and the buyer cannot be forced to buy at that price.

This is the "price equals average cost" equilibrium of rate-of-return regulation.

Surplus will not be as high as in the first-best, since the buyer will buy less if the price is above marginal cost.

The Decentralized Optimum: P = AC, ctd.

Let the price be p_1 for the normal product and p_2 for the specialized product.

$$Surplus(I, p_1, p_2) = \theta g(I) \int_{p_2}^{\overline{v}} (v - c) f(v) dv$$
$$+ (1 - \theta) \int_{p_1}^{\overline{v}} (v - c) f(v) dv - I \tag{3}$$

such that the prices lies in $[0, \overline{v}]$ and

$$\pi = \theta g(I) \int_{p_2}^{\overline{v}} (p_2 - c) f(v) dv + (1 - \theta) \int_{p_1}^{\overline{v}} (p_1 - c) f(v) dv - I \geq 0.$$

The Decentralized Optimum: P = AC, ctd.

The first order condition for p_2 turns out to be the same as for p_1, which means $p_2^* = p_1^*$.

As in Ramsey pricing, two medium price distortions are preferable to one big and one small because surplus loss rises with the square of the distortion.

The shadow price of the seller's zero-profit constraint, μ, is in $(0, 1)$. The constraint is binding and hence costly, but less than an entire unit of the buyer's surplus has to be sacrificed to the seller at the margin.

The Decentralized Optimum: The Equilibrium Investment Level

$$\Rightarrow \ -1 + \theta g'(I^*) \int_{p^*}^{\overline{v}} (v - c) f(v) dv = 0 \tag{4}$$

Equation (4) yields a smaller I than in the first-best of (2) because the integral is from p^* to $\overline{v}$, not c to $\overline{v}$.

The buyer will not purchase if his value is between c and p, even though that would be efficient, so it is not worth investing as much in trying to obtain the specialized product.

Spot Sale

Only one seller will invest, since if two do they would compete the price of the specialized good down to marginal cost, c. (We will ignore the mixed-strategy equilibrium.)

$$\pi_{spot}(I) = \theta g(I) \int_{\frac{v+c}{2}}^{\overline{v}} \left(\frac{v+c}{2} - c \right) f(v) dv - I \tag{5}$$

$$\Rightarrow \pi'_{spot} = \theta g'(I_{spot}) \int_{\frac{v+c}{2}}^{\overline{v}} \left(\frac{v+c}{2} - c \right) f(v) dv - 1 = 0 \tag{6}$$

$p^* < (v+c)/2 \Rightarrow$ seller's profit positive and there will be moderate underinvestment compared to the decentralized optimum.

$p^* > (v+c)/2 \Rightarrow$, seller's profit negative, the seller will choose $I = 0$ and there is severe underinvestment. This is the standard hold-up explanation for long-term contracts: if investment costs are sunk at the time of bargaining over price, investment will be inefficiently low. We will assume that $p^* < (v + c)/2$ in this paper.

Repeat: Hold Up Can Be a Problem Because the Investor Has a Monopoly!

To repeat: if the zero-profit price is low relative to the gains from trade, then **it is the BUYER who gets held up, not the seller who invests in relationship-specific assets.** The seller has a natural monopoly, since with big fixed investment if two sellers entered they'd both earn losses.

Thus, a long-term contract is needed to protect the buyer, not the seller. Best of all, the buyer can auction off the right to be the seller a la Demsetz (1968) on utility regulation. Then, the buyer captures *all* the surplus.

Contracting Assumptions

1. No contracting on investment.

2. No nonlinear contracts. Too complicated to evaluate in bids.

3. No fixed fees in contracts. Horn needs the money now. The government can't trust her to run off with a fixed fee.

4. Contracting on the state of the world is allowed. It won't matter that there can be a separate price when the market is thick instead of thin.

A Fixed-Quantity Contract, Zero Breach Costs

Consider a fixed-quantity contract with 1 unit and price $\overline{p}_{fq}$.

There will be efficient breach by either side. If the buyer's value v turns out to be less than c he will breach. If the seller had succeeded in designing the specialized product, the buyer would pay damages of $(\overline{p}_{fq} - c)$ to the seller.

Note that when the buyer does not need the specialized product, if the seller breaches by supplying the unspecialized product the buyer's damages are zero.

A Fixed-Quantity Contract, Zero Breach Costs, ctd.

The seller will have expected profit consisting of the cost of investment, the profit from selling if a normal product is satisfactory, the profit from selling the specialized product if the investment is successful, and the loss from breach damages if the investment is unsuccessful.

The seller now has two incentives to make investment high.

First, if the buyer needs the specialized product, the seller both gets his profit margin and avoids paying damages.

Second, if the buyer doesn't need the specialized product, the seller gets the margin anyway. It is this second effect which both helps and hurts efficiency. It hurts capacity, because it makes it excessive. It helps price, because it allows for a lower price.

Proposition 1

Proposition 1: In the specialized-product model with zero breach costs, the fixed-quantity contract is superior to the requirements or option contract in terms of total and buyer surplus.

Lemma 1. The option and requirements contract prices will be higher than the fixed-quantity contract's.

Lemma 2. Investment will be lower under the option and requirements contracts than under the fixed-quantity contract's.

Reasoning: the fixed-quantity contract induces efficient breach with expectation damages. The Coase Theorem works out. The seller can be sure of either making a sale or getting damages, so his zero-profit price can be set low. With an option or requirements contract, the seller won't make a sale as often. Thus, when he does, his price has to be higher. That's distorting: the buyer responds by not buying enough.

No Breaching

Let us now assume that neither party will breach the contract. This might be because breaching creates a bad reputation and hinders future contracting. Or, it could be that the other party will sue to enforce the contract, not because it is directly profitable but in order to preserve a reputation for enforcing contracts, and the resulting litigation costs in terms of legal fees and managerial time would make the breach unprofitable even if it would be efficient in the absence of transaction costs. It is well known that although businesses devote great care to writing legally enforceable contracts with each other, they rarely go to court to enforce them except in end-games— bankruptcy, or the collection of bad debts. Macaulay (1963) is the standard cite for that point.

Stewart Macaulay (1977) on No Breaching

"The contract litigation process may also maintain a vague sense of threat that keeps everyone reasonably reliable (see Llewellyn, 1931:725 n.47). For this process to operate, it is not necessary that business managers understand contract norms and the realities of the litigation process. Perhaps all that is needed is a sense that breach may entail disagreeable legal problems. The Polish managers described by Kurczewski and Frieske reflect this when they tell us that **"one needs to threaten [to use contract penalties] intelligently."** The authors go on to remark, somewhat paradoxically, that **the "system works well so long as the penalties [for breach of contract] are not actually applied. They work well as a threat, but their application will injure the relationship with the cooperating enterprise so that in the future it will seek contacts with other directors who have a more conciliatory approach"** (1977:497)."

Why Not Efficient Renegotiation?

What happens when a party wants to break a promise but is willing to compensate the other party and, in fact, to make them benefit by the breach. The Coase Theorem says that in the absence of transaction costs this is what will happen when the promise does not maximize surplus.

It is clear how the transaction costs of going to court prevents efficient breach. What is less clear is how the transaction costs of going to the other party to request mutually beneficial modification prevents efficient breach, but it seems that it often does.

Requesting *any* change is disruptive. It requires the parties to rethink their actions and to re-open negotatiations over how to split the surplus. These renegotiations are about "taking surplus" rather than "making surplus", and though businesses have no qualms about taking surplus, making surplus is where the real profit lies.

Doing One's Duty according to the Contract Is Important

Managers for online collaboration platform (Bozovic and Hadfield [2015]):

> I would use [the contract] as a reference document. It wouldn't be I never go back to these things, they are in a file drawer. I dig them out when I have to, when there is some reason: **what did we do? I can't remember, what did we agree to?** Oh, that's what we agreed to. All right, well that's the deal. Get on it with it.

Bozovic and Hadfield (2015) on Renegotiation

What is revealing about our interviews is the emphasis respondents placed on **the barriers they perceived to ex post negotiation and recontracting.** . . . sharing information with a contracting partner ex post is potentially very costly; there are lots of reasons, they indicated, for continuing to withhold information even if it would improve ex post decision-making. One source of such costs is somewhat mundane: engaging in ongoing negotiations and recontracting burns time and money and generates delay; with complex interactions and many dimensions of uncertainty, it is simply not worth discussing everything. More fundamentally, however, ongoing uncertainty about the durability of the relationship makes it costly to reveal one's thinking as private information about the costs and benefits of the collaboration accumulates . . .

A Fixed-Quantity Contract, No Breaching

We could have a fixed-quantity contract with price $\overline{p}$. The buyer, as in the case where there are no breach costs, will set $\overline{p}$ so that seller profits are zero.

The seller does not wish to breach, so he will choose $I = \overline{I}$. We now have overinvestment.

Also, the buyer will be buying sometimes when the product isn't worth its marginal cost to him.

An Option Contract, No Breaching

As with the fixed-quantity contract, the seller will choose $I = \overline{I}$ to avoid the possibility of breach.

The price is higher under the option contract than under the fixed-quantity contract.

The buyer never has to buy an unwanted specialized product, so that source of welfare loss is absent. He will, however, have to pay indirectly for the excess investment, so this contract will not achieve the decentralized optimum.

Proposition 2

Proposition 2: In the specialized-product model with high breach costs, the requirements contract is superior to both the fixed-quantity contract and the option contract.

Reasoning: The fixed-quantity contract is rotten now, because it makes inefficient transactions occur. The buyer may not want the good, but he buys it anyway because he doesn't want to breach or renegotiate.

The option and requirement contracts avoid that. Under the option contract, though, the seller often doesn't make a sale because it turns out the market is thick and the buyer doesn't need the specialized product. Thus, the option contract price has to be high in order to pay back the specialized investment.

Proposition 2 continued

Proposition 2: In the specialized-product model with high breach costs, the requirements contract is superior to both the fixed-quantity contract and the option contract.

Under the requirements contract, it will often happen that the buyer will buy from the seller even if the market is thick and he doesn't need the specialized product— because the contract shuts out the competing sellers. Thus, the seller can break even with a lower price than under the option contract. With a lower price, there's less distortion.

This is a little tricky, though, because under the option contract the buyer pays a very high price in a thin market and pays marginal cost in a thick market, but under the requirements contract the buyer pays a medium price in both situations. Jensen's inequality (two little triangles are smaller than one big triangle) means the medium price is better.

The Key Features of the Model

The explanation for requirements contracts relied on

(a) the buyer's uncertainty of how much he needs,

(b) the buyer's uncertainty over whether the market can supply his needs, and

(c) his demand being at least slightly elastic.

Horn Redux: Contract Reading Costs

Let us now return to *Horn v. United States.* It illustrates the peril of one party accepting the other party's standard-form contract.

As I explained in my 2001 "Explaining Incomplete Contracts as the Result of Contract-Reading Costs," a party to a contract should be wary of complicated contract language, because it may contain concealed "booby trap" language and it is harder to carefully read a complex contract than to write one.

Horn's contract contained such a boobytrap. It may even have been unknown to the particular federal officials who awarded her the contract, though the federal government has long been aware of it.

Horn Loses

The judge reluctantly but without doubt ruled against Horn, saying,

Although it appears that both parties entered into the contract with the intent to form a requirements contract, that fact cannot overcome the plain language of the contract. ...

The contract makes clear that the BOP only intended to utilize Ms. Horn for the services it could not fulfill in-house, stating, the Government shall order from the Contractor all of that activitys requirements for . . . services specified in the schedule that exceed the quantities that the activity may itself furnish within its own capabilities.

Plain Language

The plain language of the contract was clear. It addressed the question of whether the government could satisfy its requirements internally, and said it could. Labelling the contract a "requirements contract" and both parties thinking of it as such could not overrule what was written. The crucial clause was not obscurely concealed, but reading a contract incurs a transactions cost, one lower than renegotiating but costly nonetheless. Horn's skipping the cost of reading the contract meant she incurred the cost of abiding by it. Indeed, it may have been precisely because of her mistake that she won the contract award; this may be an example of the winner's curse.

"It is unfortunate that the Government has continued to use this standard form document that appears to the non-legal reader as a binding contract, but is in fact not. It is clear that this document misled Ms. Horn into believing she had an agreement with the Government when, in reality, the agreement was unenforceable. More to the point, **even the Government officials with whom she dealt did not seem to understand the documents lack of enforceability.** As early as 1929, the Supreme Court put the Government on notice that this type of contractual language created an unenforceable instrument. In 1984, the Court in *Ralph Constr. Inc.* similarly declared an indefinite quantities contract unenforceable that contained seemingly identical FAR language. Yet, more than a quarter of a century later, these FAR provisions are still rendering contracts unenforceable and unsuspecting contractors are being denied the opportunity to pursue what may be meritorious claims."

Transaction Costs

The Horn case illustrates transaction costs in a variety of ways. The government wanted to obtain teeth-cleaning services at a low price by awarding a contract in advance of knowing the quantity that would be demanded. It used a simple, one-price contract, with no signing fee for either side, keeping complexity down. And it used a form of requirements contract, to induce the provider to focus her attention on the prison's needs first. But the bureaucrats in Washington had written a requirements contract with an out, allowing the prison to hire a provider internally. Perhaps this would have been efficient even if it had been clear to both sides, but presumably the price would have been higher. I hope that Horn did not turn down attractive alternative employers in reliance on the contract, but this shows that the longer the contract, the greater the danger to the side that did not write it.

References

Bernheim, B. Douglas & Michael D. Whinston (1998) "Exclusive Dealing," *The Journal of Political Economy,* 106: 64103.

Bolton, Patrick & Michael D. Whinston (1993) "Incomplete Contracts, Vertical Integration, and Supply Assurance," *The Review of Economic Studies,* 60: 121-148.

Carroll, Gabriel (2015) http://dx.doi.org/10.1257/aer.20131159. *The American Economic Review* 105: 536563.

Charny, David (1990) "Nonlegal Sanctions in Commercial Relationships," *Harvard Law Review*, 104: 373-467 (Dec., 1990).

De Mez, David & Mariano Selvaggi (2007) "Exclusive Contracts Foster Relationship-Specific Investment," *The RAND Journal of Economics*, 38: 85-97.

Frasco, G. (1991) *Exclusive Dealing: A Comprehensive Case Study,* London: University Press of America, 1991.

Hart, Oliver & John Moore (1990) "Property Rights and the Nature of the Firm," *The Journal of Political Economy*, 98: 1119-1158.

Hart, Oliver & John Moore (2008) "Contracts as Reference Points," *The Quarterly Journal of Economics,* 123: 1-48.

Klein, Benjamin, R. Crawford & Armen Alchian (1978) "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," *The Journal of Law and Economics,* 21: 297-326.

Kurczewski, Jacek & Kazimierz Frieske (1977) "Some Problems in the Legal Regulation of the Activities of Economic Institutions," *Law & Society Review*, 11: 489.

Llewellyn, Karl N. (1931) "What Price Contract? An Essay in Perspective," 40 Yale Law Journal 704.

Macaulay, Stewart (1963) "Non-Contractual Relations in Business: A Preliminary Study," *American Sociological Review*, 28:55.

Macaulay, Stewart (1977) "Elegant Models, Empirical Pictures, and the Complexities of Contract," *Law & Society Review*, 11: 507-528 (Winter 1977).

Marvel, Howard (1982) "Exclusive Dealing," *The Journal of Law and Economics,* 25: 1-25.

Noldeke, Georg & Klaus M. Schmidt (1995) "Option Contracts and Renegotiation: A Solution to the Hold-up Problem," *The RAND Journal of Economics,* 26: 163-179

Ramseyer, J. Mark & Eric Rasmusen (2015) "Exclusive Dealing: Before, Bork, and Beyond," forthcoming *The Journal of Law and Economics.*