

Contract Law with Multi-Unit Sales

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I. Introduction

Contract law remedies implicitly suppose that parties agree to trade one unit or a homogeneous set of units. For example, under UCC §2-713, a disappointed buyer is entitled to recover “the difference between *the market price* at the time when the buyer learned of the breach and *the contract price*.”³ If the contract price of one unit is k , the market price of one unit is p and the parties agreed to trade $N \geq 1$ units, the buyer can recover $N(p - k)$: there is one price, k or p , that applies to each of the N units, and this could occur only if the units are identical. Similarly, the buyer can get specific performance under §2-716 “where *the goods* are unique”, which implies that all of them must be unique in the same way. And under §2-714, the buyer’s damages for a breach of warranty are the difference “between the value of the goods accepted and the value they would have had if they had been as warranted”. This implies that a single warranty applied to all units, if more than one, an interpretation that is confirmed by the accompanying comment’s reference to “the non-conformity”.

Contract theory is similar, though surprisingly so. Theoretical analyses implicitly suppose that the goods set parties agree to trade is homogenous.⁴ The surprise lies in the contrast with auction theory. Agents sometimes sell one unit, but other times sell several units that are not identical. The theoretical analysis of auctions treats these cases differently.⁵

We focus on sales of several goods under one contract, where the goods are sufficiently similar for parties to bundle them together but sufficiently dissimilar as possibly to be differently affected by breach. An example is a sale, or license, of several patents relating to different aspects of a product or process. The goods are patents that all relate to the same output, but the patents are differentially valuable so that, under current law, if there is breach a court cannot award damages or an injunction without disaggregating the set. Another example is mortgage securitization, an extensive treatment of which below illustrates the problems we analyze. In the years 2004-2008, parties bundled home mortgages for sale in large sets. The units were similar; they were all home mortgages. Individual mortgages within a group could differ materially, however, by loan size; the reliability of the ultimate obligor; the interest rate; the expected value realized on foreclosure; and so on. Hence, a systematic lender failure to

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³ This paper uses buyer remedies as an example; seller remedies are symmetric.

⁴ See Patrick Bolton and Mathias Dewatripont, *Contract Theory* (2005).

⁵ See Paul Milgrom, *Putting Auction theory to Work* 251-295 (2004); Vijay Krishna, *Auction Theory* 163-77 (2002).

investigate borrowers sufficiently could cause different declines in mortgage value. Movies and other goods also are bundled and sold together.

Generalizing from these examples, we define a “single unit sale” as the sale of one item or the sale of several homogeneous items. A “multi-unit sale” is the sale of more than one item when the items are sufficiently similar to make it efficient to sell them together, but sufficiently dissimilar as possibly to be differentially affected by breach. Similarity among traded units implies the possibility that breaches are positively correlated across the different units. For example, if a patentor did insufficient research on the state of the prior art, some patents in a sales set may be adversely affected, though to different degrees, and probably not all patents would be affected. That correlations are positive but not perfect and that more than one unit is traded under the same contract create what we call “the large number problem”: imperfect correlation raises the possibility of differential breach effects while the large number of units raises the possibility that it may not be cost justified for the buyer to establish when, and to the extent that, breach affects particular items within the traded set. This paper asks what remedies are efficient when the large number problem may present.

Consider these questions. When some units are defective (i.e., they result from breaches), but the full set traded is large, third parties cannot easily identify particular defective items. If these parties nevertheless believe that breaches have occurred, the market value of the entire set will fall: prospective ultimate buyers (from an intermediate seller) or lenders will offer less or lend less against the set (referred to herein as “the portfolio”). Under current law, a buyer of the portfolio must establish breach item by item (patent or mortgage). This can be very costly. Should contract law expand to permit “group defaults”? That is, if the value of the portfolio falls materially in consequence of breaches, should the buyer be permitted to use standard remedies – to cancel the entire sale, to recover the value difference between *portfolio value* as warranted and as delivered? If so, how should the law define “materially”?

If the law should not change, can parties *contract for* a “portfolio default”, as they define default? Thus, let a contract to sell a patent portfolio define a “default” as a decline in portfolio market value by $x\%$. The contract remedy would require the seller to buy the entire portfolio back. Suppose that the actual number of breached items would, if known, reduce the value of the portfolio by $y\%$ where $y < x$. The value of the portfolio if there were no breaches would have been V . Under the contract remedy, the buyer’s “true loss” is $(1 - y)V$, and his market loss is the greater $(1 - x)V$, but the contract authorizes the buyer to recover *all of* V . Suppose that the parties’ reasonable expectation, when they contracted, was that breaches could materially reduce the value of the portfolio, but not to zero.⁶ Then the buyback remedy

⁶ Both x and y , the parties would believe, are bounded away from zero. The market fall usually will exceed the actual fall because prospective buyers or lenders will discount for risk.

necessarily over-compensates the buyer. Should it be void as a penalty?⁷ If so, again the buyer will have to establish breach as regards individual units.

Buyers bear the burden of establishing breach for accepted goods but a modified individuated contract law could supply an alternative to the portfolio default term just analyzed by shifting the burden of proof to the seller. Consider three sample rules: (a) If the market value of the portfolio fell by a material amount, the seller would have to buy back (or pay damages for) every unit as to which the seller could not establish compliance; (b) If the buyer establishes actual breaches for a material number of units, the seller has to buy back (or pay damages for) those units and every other unit for which it could not establish compliance;⁸ (c) If the buyer shows that y percent of items in a “representative portfolio sample” is defective, the law should assume that y percent of the entire portfolio is defective, so that again the seller would have to buy back (or pay damages for) y percent of items in the portfolio. Would any of these rules be optimal? If parties contracted for any of the solutions these rules embody, should their contracts be enforced?

Portfolio defaults could be positively correlated for two reasons. First, the seller’s breach entailed pursuing a practice that likely would produce numerous noncompliant items. As examples, the patent portfolio seller’s practice was to slight research into the prior art, or the mortgage portfolio seller’s practice was to slight good underwriting standards. Second, exogenous events could affect the portfolio. Thus, an industry recession could reduce the value of a patent portfolio and a general fall in real estate prices could reduce the value of a mortgage portfolio.

It is a general contract law premise that sellers bear defect risk and both parties bear market risk.⁹ How should this premise apply to multi-unit sales? For example, suppose that the law, or a contract, requires the seller to buy back a portfolio that has fallen in market value by x percent. Should the seller be permitted to show that only a fraction of the fall could be attributed to its breaches? Should the buyer bear the burden of disaggregating exogenous from endogenous risk? Or should the law ignore the issue, leaving it to the parties to specify those risks that each of them is to bear?¹⁰

⁷ Contract law will not enforce a damages term that, the parties can anticipate, will necessarily award the promisee more than her expectation interest. Here, $(1 - y)V$ is *necessarily* less than V when $y > 0$ so a term awarding the buyer V may be challenged as a penalty.

⁸ There is some contract law authority that when a party establishes a breach in a single unit sale but damages are difficult to prove, the burden of proof shifts to the other party to reduce the first party’s damage claim. How this authority should apply to the multi-unit case is not known.

⁹ In simple fixed price contracts, sellers bear the risk of a market advance and buyers bear the risk of a market decline.

¹⁰ This is the practice regarding acquisition agreements. These permit an acquirer to exit if there has been a “material adverse change” – these reduce target value – between the agreement and closing dates, but the

All of the questions this Introduction asks are open and they are significant. Ex post, contract remedies shift wealth between the parties; ex ante, they affect entry¹¹ and the parties' incentives to comply with the contract's substantive obligations. Regarding the latter, contract remedies compensate for but also attempt to deter a particular form of moral hazard: the promisor exploiting asymmetric information and high enforcement costs to reduce its compliance level. Multi-unit sales make this form of moral hazard more likely. In this context, breach can affect particular units differently and not affect every unit. Then the large number of units creates asymmetric information: while a drop in value of the whole may be readily observable, just which units caused the problem is not readily observable. Picking out only the defective units and then suing only with respect to those can be quite costly. The moral hazard concern is heightened when portfolios are traded because later buyers likely have less information about the originating context and how breach can occur, and therefore higher costs of establishing violations. So to summarize, contract law remedies' individuating character can much reduce the law's efficacy in compensating for and in deterring the moral hazard of reduced contractual compliance in connection with multi-unit sales. And this raises the related questions how the law should change regarding these sales and what optimal contracts for such sales would look like.

As an illustration and motivating example, it is argued below that contract failures – by the parties and the law -- were a neglected and possibly contributing cause of the Great Recession. These failures made many securitization contracts extremely difficult to enforce as written. The incentive that contracts can create to increase the level of compliance thus were seriously attenuated in the securitization context. Better contracts, in connection with more suitable remedies, might have produced fewer and sounder mortgages.

Part 2 below is the case study of securitization contracts, which is set out as an informal model. As said, the model is meant to exhibit the contract writing failures that affected them and it attempts to trace these failures to contract law's failings itself. In brief, parties traded highly information sensitive securities – mortgages – as if they were highly information insensitive securities – T Bills. As a consequence, the contracts were very hard to enforce and so put little pressure on the various sellers to take care when creating and trading the mortgages. Part 3 is a formal model [to be written] that attempts to generalize the case study. The model's goal is to introduce a very complex subject: multi-unit sales that are subject to

agreements go on to identify various exogenous value affecting events, the occurrence of any of which bar the acquirer from enforcing the material adverse change clause. See Ronald J. Gilson and Alan Schwartz, "Understanding MACs: Moral Hazard in Acquisitions", 21 J. L. Econ. & Org. 330 (2005).

¹¹ Some rules relating to the recovery of market damages thus likely deter buyer entry. See Alan Schwartz and Robert E. Scott, "Market Damages, Efficient Contracting and the Economic Waste Fallacy", 108 Colum. L. Rev. 1610 (2008).

both endogenous and exogenous correlated uncertainties, and the legal implications of the consequent risks. There is little in the economic and legal literatures concerning this subject.

II. Securitization Contracting: An Informal Model

A. *The Context*

Agents in the model trade a debt obligation. All markets are competitive. The original obligor is an individual person. The person borrows the sum x from a bank B to buy a house. Because the market is competitive, B expects to be repaid x (B earns a competitive return on capital invested in its business). The obligor promises to repay the sum R , in installments. The probability of repayment is $p < 1$, which implies that $R > x$. The x the bank lends is a fraction of the obligor's house value, denoted β , where $0 < \beta \leq 1$. Denoting the house value net of foreclosure costs c , if $\beta = 1$, $x = c$: the bank lends the full amount of the house and so does not require a down payment. As β falls, the obligor pays more up front. To secure the loan the obligor gives a mortgage to the bank, with the house as collateral. Loan contracts define "events of default", which always include the obligor's failure to make a payment. An event of default entitles the bank to enforce the mortgage: to sell the collateral. We assume "strict foreclosure": the bank can repossess, but the obligor is not liable for damages.¹²

Under this contract, and the law, the bank bears solvency risk and foreclosure risk. To see how, suppose that the obligor repays $j < R$ before defaulting. Regarding credit risk, without strict foreclosure, the bank could sue for $R - j$ in a deficiency action: the bank's risk would be increasing in the obligor's inability to make up the deficiency. Under strict foreclosure, the bank is *required* to absorb the deficiency, against which it can offset only c . If $c > R - j$, the bank must repay the excess to the obligor. Because this almost never happens, the realistic case has $c \leq R - j$. The bank then bears the loss, which is $R - (c + j)$. Its risk thus increases as the expected foreclosure realization declines. We also model the bank as a single agent; that is, we initially abstract from possible agency conflict between the bank and its loan officers. Some officers may be willing to make bad loans to meet a quota. We ignore this possibility because our focus is moral hazard between various sellers and buyers in the securitization market.

The contract between the bank and the individual obligor is denoted k_1 . Because the bank will sell k_1 , we have to characterize its value. We initially write $v(k_1) = f(R, p, c)$: the promised repayment sum; the probability that the sum will be repaid; and the bad state, or default, payoff c . The probability p , in turn, is a function of the obligor's quality, denoted q : i.e., $p = f(q)$, where q is distributed on $F(q)$. There are three kinds of information relevant to the

¹² Strict foreclosure is the law many states.

value of q . The first is “hard” information, which is the obligor’s FICO credit score, denoted s .¹³ We assume that s is verifiable: that is, the score is observable to the bank and to any other purchaser of the contract k_1 . The higher the score the greater is the likelihood of repayment. FICO scores are distributed among the population of the bank’s potential obligors on $F(s)$, which is common knowledge to all agents in the model. Hence, every contract in the model can condition on it.

An obligor’s quality also is a function of “soft” information: factors that correlate positively with repayment. These include whether the obligor has a job, a good employment history, lives in the home he is buying, is not speculating in the real estate market. This information is denoted b for two reasons: relative to later purchasers of contract k_1 , the bank is much better suited to observe the factors and usually is better equipped to evaluate them. Assessing obligor quality q requires consumer lending expertise and, as explained below, “local knowledge”. We let b denote these soft factors. The third factor relevant to predicting the default probability is β , which determines the size of the down payment (if any). Other things equal, the obligor’s probability of repayment is inversely related to β : the lower is β – i.e., the higher is the down payment – the less the obligor has to repay, and the greater is the probability that the obligor will repay it.

We should say a little more about the repayment probability. Suppose that $\beta < 1$. The bank then has a “cushion” of $1 - \beta$. For example, let the foreclosure value, c , be 100 and $\beta = \frac{1}{2}$. The bank thus lends $x = 50$ and requires the obligor to repay something over 50 (depending on p). Because foreclosure is strict, the bank can recover only c on default. The home thus would have to fall by more than 50% for the loan to be under water.¹⁴ Thus, the bank’s risk falls as β increases.

Finally, the value of loans partly depends on local factors. Because foreclosed homes are sold in the bank’s locale, again relative to later contract buyers the bank is best equipped to predict foreclosure values. Also relevant is how local courts and administrative officers treat foreclosures and foreclosure sales. Will officials help the bank if an obligor resists yielding his home? Are foreclosure sales conducted quickly? Do officials give adequate notice to potential buyers? Evaluating collateral value c , as said, thus requires local knowledge. And summing this analysis up, because the repayment probability is a function of β and the applicant’s quality q , and because q is a function of s , b and β , we rewrite contract value as $v(k_1) = (R, p | (s, b, \beta), c)$.

¹³ The FICO score is calculated from relatively objective data, such as an obligor’s credit history and income. It is a proxy for the obligor’s ability to repay.

¹⁴ In the illustration above, if the default probability is .1, R , the promised repayment, would be a little over \$54 when the debtor receives $x = \$50$.

The bank makes a $n > 1$ loans each period, depending on its liquidity. The expected collateral value of each loan is denoted c , but c can change over time. We assume the housing market is informationally efficient: the value of c in period $t + 1$ is $E(c)_{t+1} = c_t + \sigma^2$, where σ^2 has mean zero and positive variance. The value of the portfolio the bank can sell is $L = \sum_1^n v(k_1)$.

The model so far assumes that the bank does not behave strategically. We relax this assumption by supposing that there is a standard method -- “good underwriting practice” -- for making secured loans on persons’ homes. The inputs to the standard method include the obligor’s FICO score s and the relevant soft information – the obligor’s job, income, personal traits, etc. The inputs the standard method uses also include the locally customary β : if it is good practice to use a β of .8, the bank should require the obligor to make a 20% down payment. The standard method tells the bank how to aggregate the hard and soft information when deciding whether, and how much, to lend. The standard method also includes customary practices for valuing collateral.

We assume that it is more costly for banks to make loans using the standard method than to shirk. Moral hazard in the model thus has the bank violating some, or all, of the standard method’s requirements. The bank behaves strategically when, as examples, it uses a high β (requires a small or no down payment), does not require the obligor to live in his home, does not require him to have a job, etc. The bank also behaves strategically if it formally adheres to the standard method, but does not verify compliance with it. For example, the obligor misrepresents his income or employment status and the bank does not check.

To complete the informal model description, the bank plans to sell its portfolio to an entity called an “originator”. The originator buys the portfolio L at a fraction of its value and resells the portfolio for more, realizing income on the spread. Originators actually buy portfolios from several banks, bundle them and resell the entire bundles to a large bank, which we denote “the seller”. The seller, in turn, aggregates some of these bundles and resells the bundles to “Trusts”. A trust is the public investment vehicle. Investors such as hedge funds, pension funds and individual persons buy certificates in a Trust. The certificates are similar to bonds, in the sense that they entitle the investors to the obligor repayments on their mortgages (suitably discounted).¹⁵ Because the value of the initial portfolio falls below L as the likelihood that the bank behaved strategically increases, banks have an incentive to persuade later purchasers that the bank wrote loans using the standard method. This is the contracting problem.

¹⁵ There were other actors in the securitization market. For example, “servicers” administer loans, collect payments and respond initially to payment failures of which they are aware. It is unnecessary to consider servicers because, by contract, they are the agents of the large selling banks.

B. *The Bank/Originator Contract*

Our informal presentation does not solve for the optimal contracts in this distribution chain but rather sets out the parties' contracting options and the legal issues those options raise. Analysis begins with the information structure in the contract between the bank and the originator to sell the portfolio L . The originator can observe the contract between the bank and the original obligor k_1 . Hence, the originator observes R , the debt, and a description of the collateral c . The originator also knows the distribution of FICO scores in the relevant population, and, we assume, it can observe the scores of the individual obligors. If the originator is experienced and buys portfolios from banks that are relatively contiguously located, the collateral descriptions in the contracts would permit it to construct a good estimate of the values backing the portfolios. Finally, an originator may develop an informed estimate of bank quality, denoted q_B .¹⁶ A high quality bank uses the standard method to make loans. An originator combines what it does know, its view of bank quality and common knowledge of "macro factors" to assess the value of loan portfolios that banks offer.

Nevertheless, moral hazard is a serious problem. The originator cannot observe, without making a costly investigation, whether a bank uses the standard method because it cannot observe, and may not be able fully to evaluate, b , the soft factors that correlate with the repayment probability. Also, the originator cannot observe the β the bank used when deciding how much to lend because it cannot observe x – what the bank actually did lend. Finally, the originator lacks knowledge of the local factors that can affect foreclosure value.¹⁷

Turning to contracts the parties could write, the question we ask is how a contract can create incentives for the bank to use the standard method and its local knowledge when making loans. Thus, we focus on contract remedies. We consider three possible contracts:

(i). *The no discretion contract, denoted k_N* : The originator buys only portfolios in which every loan is to an obligor with a FICO score above a specified cutoff level. This contract may be optimal if q_B generally is low: that is, moral hazard is expected to be common. Otherwise, the k_N contract is unlikely to be optimal because it makes the bank's role ministerial: the bank would have no incentive to consider and evaluate much of the information relevant to making good loans, such as how soft information affects the repayment probability, what inferences to draw from local knowledge, and the like.

¹⁶ With this notation, we later refer to applicant quality as q_A .

¹⁷ As may be obvious, the more portfolios an originator buys the greater is the originator's difficulty in evaluating each one.

(ii). The individuation contract, denoted k_i :

The individuation contract would have three relevant features: (a) The contract carries over the definition of acts of default from contract k_1 : if, for example, the individual obligor misses a scheduled payment, the bank seller party to k_i has committed a breach; (b) The bank warrants that it used the standard method when making the loans in the portfolio L; (c) The standard remedy for a breach of warranty or other breach for accepted goods is the difference between the value of the goods as warranted and as accepted. Actual securitization contracts used a variant: initiating banks did warrant that they complied with (good) standard underwriting practice. If an originator could show that the bank breached this warranty with respect to a particular loan, the bank would be required to repurchase the loan from the buyer for its face value less payments made. Here, the bank would have to pay the originator $R - j$ for the loan and then foreclose. The bank thus would incur a loss on the loan of $R - (c + j)$.¹⁸

The optimality of the individuation contract should be increasing when: (a) bank quality k_B is generally high (i.e., moral hazard is expected to be low); (c) b or the originator's portfolio, or both, are small. That is, each loan portfolio contains few loans or the originator buys few portfolios. In this case, portfolio evaluation costs are low; (c) The costs of discovering breach and enforcing the contractual remedy are relatively low.

This last factor is particularly important. A purchaser from the originator or a random third party may identify particular breached loans to the originator, who then would notify the bank. If the bank did not cure the breach, the originator would then require the bank to repurchase the loan. In the usual case, however, the originator would have reason to suspect a breach only if the entire loan portfolio L was performing poorly. An individuation contract then could take two forms. First, the contract actually could be individuated: the originator would be required to identify particular nonperforming loans and show that the bank could not have made these loans using the standard method because the bank knew or should have known that the obligors were unemployed, did not live in their homes, were speculating, etc. Thus, the loans breached the bank's warranty. This form would be very costly to implement.

Under the second form, the originator would have only to show that the bank's business practice itself violated the standard method. For example, the bank routinely did not check an obligor's employment status. The second method would be much less costly than the first, but

¹⁸ In commercial law, the buyer of a breached product must give the seller notice of the breach within a "reasonable time". A reasonable time gives the seller has an opportunity to cure the breach. Securitization contracts specified a time period for a bank to cure a beach (90 days) after the bank learned, or was given notice, of the breach. Nnotice issues seem of second order here.

it would raise the novel legal questions that the Introduction set out. The form would have a better chance of passing the parties' cost benefit test if the bank had to buy back the loan portfolio itself on a showing that it systematically did not use the standard method to create it. As said above, this is not the usual remedy for a breach of warranty. Also, if the bank agreed to the remedy, there is a question whether a court would void the agreement as a penalty, on the ground that it probably was unreasonable to assume that violating the standard method necessarily would yield the damages -- $\sum L$ -- that the originator suffered.

This second form also would have a good chance of passing a cost benefit test if the showing that the bank systematically did not use the standard method would shift the burden of proof to the bank. Because the burden would be shifted by a showing that the bank breached its warranty generally, by not following the standard method, the bank then would have to buy back every loan that it was unable to show would have been made using the standard method. There is some legal authority that the burden of proof does shift to the promisor after the promisee is shown to have committed a material breach, but the authority is sparse, commonly relates to single unit sales and has not been used in this context. Also, given the cost of individuating loans in this way, to shift the burden of proof to the bank would raise the penalty issue anew.

To sum this discussion up, the individuation contract k_i would be more attractive if the cost of establishing breach was relatively low, and that cost might be low enough if the novel legal questions were resolved in the originator's favor. On the other hand, this informal model would have a normative implication if the optimality of individuation contracts required a favorable resolution of these legal issues. A contract law so modified would efficiently open up the contracting space.

(iii). The portfolio contract, denoted k_p : The portfolio contract would expressly define the entire loan portfolio L as the "product". This contract is more likely to be optimal if, as suggested above, bank moral hazard is thought to be systematic. Also, the contract is more likely to be optimal when enforcement costs are high.

Because portfolio contracts are not seen, there is a legal question whether a court would allow the aggregation. That there is a question also suggests a normative implication: if k_p would be optimal in some circumstances, contract law *should* permit it. On the assumption that it would, the contract would require the originator to buy the portfolio back if the portfolio fell materially in value. Merger agreements permit the buyer to exit if there is a "material adverse change" that would reduce the value of the target. Because the remedy is exit, the buyer need only establish the existence of events that would correlate with a material value decline. In the securitization context, the remedy would require the seller to pay money. Thus, the portfolio contract could be written in either of two ways. First, if there were a material

adverse change, similar to the changes on which merger agreements conditioned, the seller would have (a) to buy the portfolio back at face value less total payments collected from obligors; or (b) to pay the originator the difference between the value of the portfolio as it existed and the value it would have had if there were no breaches. The second method, similar to the individuation contract, would require the buyer to establish that the selling bank's business practices themselves violated the standard method.

Regarding enforceability, contract k_p is not seen, so whether a court would permit parties to define portfolios as products is unknown. The actual contracts between the large selling banks and the trusts were individuated, but the buyers in law suits tried to persuade courts to treat the contracts as if they were k_p contracts. This was a serious stretch on the language, but the cases were settled before the issue was decided. If k_p contracts are enforceable, this issue goes away. The second way to write a portfolio contract would be to provide that the selling bank had to buy the portfolio back (less payments made) if the portfolio fell in value by a contractually defined $x\%$. Again, legal enforceability would be an issue.

Portfolio contracts raise an issue similar to an issue in the merger context. A loan portfolio could fall materially in value either because the selling bank did not use the standard method or because of exogenous events. In contract law, buyers bear the risk of exogenous value declines. Hence, portfolio contracts present a serious drafting problem: to "carve out" the exogenous events whose materialization could cause portfolio value declines. As in the merger context, carve out negotiations probably would be contentious and time consuming; they would make portfolio contracts costly to write. Also, these contracts would create a serious econometric issue if both systematic factors – warranty breaches and exogenous events – occurred together. The originator thus would have to decompose a portfolio value decline into exogenous and endogenous causes.¹⁹

To summarize, a contract between the bank that creates a mortgage portfolio and the originator that is the initial purchaser of that portfolio could take three forms: a no discretion contract that conditions only on FICO scores; a contract that individuates the remedy for breach by requiring the originator (or perhaps the initiating bank) to identify just which loans were breached; and a portfolio contract, that would define the portfolio as a single product and let the buyer use the standard remedies for "product" breach. Each of these contracts apparently could be optimal in some circumstances, but contract law may not enforce the latter two contracts in their likely efficient forms.

¹⁹ The trusts confronted this issue but again their econometric methods were not tested in court because the cases were settled.

There are two interim results. In the actual case, the parties wrote simple individuation contracts, and then had considerable difficulty enforcing them. The first result the informal model yields is that, in the multi-unit securitization context, the legal rules may have been partial barriers to the writing of contracts that would have responded optimally to the moral hazard concern. The second result is methodological. There is a need for theory that would permit the applied researcher, and actual parties, to identify more precisely the institutional constraints and economic factors that would determine which contract types would be economically feasible to write and would give the banks incentives to use the standard method when creating loans. Part 3 of this paper begins the latter task, but it is first necessary to look at the additional distribution contracts.

C. The Originator/Seller Contract

The analysis supposed that originators hold loan portfolios to maturity, but originators sell the portfolios they buy to large banks, usually called sellers. Sellers buy portfolios from several originators. As regards moral hazard, the contracting problem, in a seller/originator contract, is how to give the originator an incentive to buy portfolios the loans of which have been created by the standard method. The solution to this problem is not obvious because the information environment in the originator/seller market is impoverished relative to the environment that obtains in the bank/originator environment. The seller bank, denoted B_2 , cannot know more than the originator knows, but should know less.²⁰ The seller cannot conveniently estimate individual bank quality, q_B , because there are many banks in the typical set of bundled portfolios the originator sells, and the seller buys many bundles. In addition, while originators may have local knowledge – how local banks foreclose, etc. – the seller bank, B_2 , has essentially no local knowledge at all. Also, because B_2 buys bundled portfolios from a number of originators, it likely is impractical for B_2 to observe the originating contracts – those denoted k_1 above – between the first bank and the individual obligor. Hence, B_2 could not draw the payoff relevant inferences from observing those contracts that the originator could draw – who the obligor is, what she does, what the collateral is, etc. And even if an officer of B_2 would read a collateral description in such a contract, she would be unlikely to know enough about the particular local context to estimate what the collateral would be worth on foreclosure. To recall, multi-unit sales may create what was defined above as the large number problem: it may not be cost justified for the buyer to evaluate every unit in the set being sold. The large number problem is acute in the securitization context.

The purchasing bank B_2 could observe FICO scores and it can observe payoff relevant macro factors. The most important such factor would be the state of national and regional housing markets. The bank's estimate of particular portfolio value, however, should have

²⁰ The purchasing banks are large. Citibank, Morgan Stanley and Wells Fargo were purchasing banks.

considerable variance because such general knowledge would have to be combined with local knowledge, which the bank lacks. Finally, B_2 may be able to evaluate the quality of some originators.²¹

An individuation contract k_i is unlikely to be optimal when the large number problem presents. An originator and the seller B_2 could write a version of the no discretion contract k_N ; the version would require each portfolio L to have an average FICO score above a cutoff level. This contract would reduce moral hazard but again it throws away a lot of information. Thus, not only could moral hazard persist but B_2 could reject loan portfolio bundles that are likely to perform well. The no discretion contract nevertheless may be optimal if B_2 suspects that moral hazard on the initial level is likely and it does not trust originators to reject suspect loan portfolios.

The originator and B_2 also could write the portfolio contract k_P . The efficiency of portfolio contracts should increase in the large number problem. B_2 could observe loan portfolio value, and so would know that either macro factors or moral hazard (or both) could be causative. Particularly if the macro factors have not materially worsened, B_2 would then have reason to believe that moral hazard had occurred; and it would then invoke the portfolio repurchase option that that is an essential feature of the portfolio contract. As indicated above, however, the legal issues described above regarding these contracts would be present here. Putting these issues aside for now, the value of a portfolio contract is that it permits the relatively uninformed buyer to put risk on the relatively informed seller. A seller/originator that had to take a portfolio back, if there were grounds to suspect moral hazard, would then invoke its remedies in the contracts it had with the initiating banks. This would put risk on those banks, which, from a moral hazard viewpoint, is where risk belongs.

D. The Seller/Trust Contract

Banks such as B_2 are called sellers because they bundle the bundled loan portfolios they buy from originators and resell the portfolios to “trusts”. The trusts sell “certificates” in themselves on the capital market and use the proceeds to buy portfolios. The object of this entire distribution chain is to make it possible for local banks to access the public capital markets for funds to make home loans. Public money has historically been cheaper than private money.

²¹ Some purchasing banks attempt to solve their information problems with vertical integration: they buy or set up their own originators. Banks who do this also buy from independent originators, however. Thus there are IO questions, such as when to make or buy. We do not pursue these questions here because we are interested in optimal contracts.

Returning to contracting issues, the environment in the seller bank/trust context is even less informationally rich than that in the originator/seller context. A trust cannot observe originators nor can it realistically evaluate loan portfolios. As a consequence, the trusts function largely as conduits, transferring payments from portfolios to their certificate investors. Indeed, the trusts disclaim liability for portfolio performance, and reject monitoring duties in their downstream contracts with the public investors. A trust duty, however, is to enforce the contracts it writes with banks such as b_2 . As is apparent, individuation contracts are unlikely to be optimal in the seller/trust context. The parties' realistic choice apparently is between versions of the no discretion contract and the portfolio contract.

E. Results and contracts

Remedies necessarily are individuated in single unit sales: breach can affect only one thing, or a set of identical units. Individuated remedies may, or may not, be optimal for multi-unit sales, depending on how serious the large number problem is. When individuated remedies apparently would not be enforceable, the parties would want to contract on portfolios – the full set of units sold. What is called the no discretion contract would condition on one feature, if there one exists, that correlates with portfolio value, and require that variable to take on a minimum value. An example is to require the obligor in every mortgage in a bundle to have above a minimum FICO score. The other contract is called a portfolio contract; it conditions remedies on the performance of the portfolio as a whole. Such a contract can define a default as a specified fall in portfolio value or breach as to a minimum number of single units. The no discretion contract is enforceable under current law, but seemingly would be efficient in limited circumstances because few single factors would proxy well for all of the variables that affect portfolio values. The portfolio contract would do better, but is questionably enforceable under current law.

These results cast the real world in a new and depressing light. Even without doing the essential formal analysis, a well-grounded view would hold that the efficiency of individuation contracts is falling as the large number problem is increasing. As a consequence, these contracts could be optimal, if at all, only in transactions between the banks that wrote mortgages and the originators to whom the banks sold. Even there, it is unclear whether the individuation contract is always best or when it works well. The large number problem apparently would preclude individuation contracts between parties later in the mortgage distribution chain. In the real world, however, it was individuating contracts all the way down.

Turning to those contracts, after a series of sales, the trusts held the bundled mortgage portfolios. Hence, the Trustee would initially learn of a problem, or certificate holders or others who learned of a problem would notify the Trustee. Typical language in a contract between a seller and a trust provided: "Upon discovery by any of the parties hereto ... of any breach of any

representation, warranty, or covenant made by the Seller in [identified contract section] in any Mortgage Loan that materially affects the value of such Mortgage Loan or the interest therein of the Certificate holders, ... such party or the Trustee shall promptly notify the Seller and the Servicer of such breach and cause the Seller to cure such breach within 90 days from the date the Seller was notified of such breach. If the Seller fails to cure such breach in all material respects during such period, the Seller shall repurchase such Mortgage Loan from the Trust Fund at the purchase price.”²² A typical warranty would provide, in the seller/trustee context, that “The origination, servicing and collection practices with respect to each Mortgage Note and Mortgage ... have been conducted in all respects ... in accordance with the proper and prudent practices in the mortgage origination and servicing business. ... The Related Mortgaged Property is free of material damage and waste To the best of Seller’s knowledge, the related Mortgaged Property is lawfully occupied under current law Each Mortgage Loan at the time of origination was underwritten in general in accordance with guidelines not inconsistent with the guidelines set forth in the Prospectus Supplement and generally accepted prime or sub-prime credit underwriting guidelines.”²³

As is apparent, the seller/trustee contract was individuated. The trust’s remedy is triggered by “breach ... of any warranty in any Mortgage Loan”, and the remedy itself is individuated: the contract requires the seller either to “cure ... [the breach] or repurchase *such Mortgage Loan* ... at the purchase price.” The warranties also are individuated. The seller warrants that “*Each Mortgage Loan*” was originated “in accordance with proper and prudent practices”. The seller also warrants that particular homes are “free of material damage and waste” and “to the best of the Seller’s knowledge ... are lawfully occupied”.

Moving down the distribution chain, a typical “Secondary Liability Clause” provides that “if the Seller or related Originator, as applicable, does not ... cure such defect [in documentation] or breach in all material respects during such [cure] period, the Trustee shall enforce the obligations of the related Originator under the related Purchase and Servicing Agreement ... and then, to the extent that the related Originator fails to cure such defect or breach, the [obligations of the] Seller under this Agreement, and cause the related Originator or Seller, as the case may be, to repurchase that Mortgage Loan from the Trust Fund at the purchase price”²⁴ Purchase and servicing agreements are made between originators and sellers. These contracts thus also were individuated. The originator or seller must cure a

²² Contract JPMAC 2006-CW1. The seller was JP Morgan.

²³ BSABS 2005-1 §2.03b. EMC Mortgage Corporation was the seller. Regarding default, a typical provision provides: “A Mortgage Loan is ‘Delinquent’ if any payment due thereon is not made pursuant to the terms of such Mortgage Loan by the close of business on the day such payment is scheduled to be due”. SACO 2007-VA1 §1.01. This contract was between the last transferee to a trust and the trust. The last transferee, whose duties were largely ministerial, was the “Depositor” SACCO I INC.

²⁴ JPALT 2005-A2 §2.05(a). The Seller here was JP Morgan.

breach in “that Mortgage Loan” or repurchase it from the trust. Trusts bought as many as 10,000 mortgages in a bundled portfolio. Under the contracts that governed these sales, a trust, and earlier buyers, were required to identify single breached mortgages and require the sellers to repurchase just those mortgages.

The knowledgeable and well represented firms that participated in the securitization market thus wrote one of the three apparently possible contract types – the individuation contract – though informal analysis strongly suggests that the contract was suboptimal in many of the circumstances in which it was used. The remedies in these contracts tracked contract law,²⁵ and it may have been that the firms’ lawyers believed that only individuation contracts would be enforceable under that law. This belief, if held, was importantly mistaken. An individuation contract here was de jure enforceable but, in consequence of the large number problem, realistically not.²⁶ In the event, the contracts worked poorly. The downstream buyers learned that they could not enforce the contracts as written because it was too costly for them to identify particular breached loans. And moral hazard was common.

The informal analysis to here raises two questions. First, as a general matter, can we be more precise about just what optimal contracts governing multi-unit sales actually would look like, and when one of the possibly implementable contract types would be optimal? Second, if contract law remedies were expanded to permit efficient multi-unit sales contracts, would those contracts complement or substitute for such regulation as now attempts to create efficient incentives for bank sellers by requiring them to retain a portion of a loan portfolio? We postpone consideration of these questions until we do more formal work.

3. A model of multi-unit sales

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²⁵ Requiring a buyer to repurchase a loan at face less payments made is similar to the common remedy for breach of warranty, that permits the buyer to recover the difference between the value of the goods as warranted and the value the goods actually had.

²⁶ The firms also may have misconceived the contracting problem they actually faced.