CHAPTER 4

Credit Default Swaps and an Application to the Art Market: A Proposal

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4.1 INTRODUCTION

Wealthy individuals are often asset rich and cash poor. With their capital tied up in assets they tend to want access to loans backed by assets. Asset-backed securities (ABS) were first

introduced in the United States in the 1970s in the form of Mortgage backed securities. More recent forms are Automobile backed securities and Credit-Card sacked securities. These loans all have the underlying asset as the collateral in the case of credit default. However, the move toward loans backed by artworks has been much slower in evolving. This is mainly due to the inability to correctly assess the risk from changes in the price movements of art. Since the collection of a number of price indices this is now becoming easier. Price movements may be more easily tracked for the art market in general. However, the art market is made up from heterogeneous goods, where the value of an individual artwork is still very difficult to evaluate.

In the arts sector a famous example of securitization was the issuance of loans using royalties as cash flows, consequently named Bowie Bonds after singer David Bowie who securitized 10 years worth of royalties. Another example is the recent move by some private banks to make loans against yachts as collateral.

The major problem for banks in the introduction of plain vanilla art-backed securities is the management of the art risk. At present the market is highly illiquid, which makes daily management of art risk almost impossible at market prices; a requirement of the Basel accord for banks' capital requirements.

However, through the introduction of art credit default swap contracts (ACDS) banks can transfer undesirable art risk from holding artworks on the banks' balance sheet to a third party that is willing to hold the art price risk. In return for doing so, a premium is received. The risk from incorrectly pricing the derivative contract is substantially smaller than the risk from holding the underlying art risk, providing an efficient solution to transferring risk for the banking sector. We explore this concept in this chapter.

The outline of the chapter is as follows. In the following section we introduce art as an alternative asset class, and the characteristic risk and return profile of art. In Section 4.3 we discuss art lending and the inefficient nature of the current practice. In Section 4.4 we show how risk management tools can be adopted to transfer undesirable art price risk from banks to third parties who are willing to protect the bank against the credit default risk on art-backed loans because they are willing to buy the art held as collateral at a guaranteed price in the case of default. This insures the bank against adverse movements on art markets, in times of high credit default probabilities. The introduction of this financing structure would result in a more efficient market for lending against art. The mechanism behind the trilateral financing structure is addressed in Section 4.5, with the introduction of ACDS contracts. Pricing equations for these ACDSs are introduced in Section 4.6 and an example is given. Conclusions are then drawn in the final section, Section 4.7.

4.2 ART AS AN ASSET CLASS

There have been a variety of studies devoted to the estimation of art indices to gauge average returns in the art market. Data goes back as far as the seventeenth century. "Art" is far too general a term to generate any meaningful analysis, therefore, much as traditional assets are categorized, we limit the discussion of art to visual fine art: paintings, drawings, and sculpture rather than the performing arts.

Art price indices have been created using three main methodologies: average prices, repeat sales regression, and hedonic regression. Chanel, Gerard-Varet, and Ginsburgh's study indicates that over long periods the respective methodologies are closely correlated (Chanel et al. 1996). Also see Ginsburgh, Mei, and Moses (2006) who look at the differences in the modeling processes of the various types of index construction. Goetzman (1993) points out the selection bias derived from looking only at repeat sales on auction house data. Repeat sales regressions require artworks to put on the block at least more than once to be included as a repeat sale. It is thought that artworks which fall drastically in value tend not to be resold at auction.

The information from databases that collect art sales information is problematic for a number of reasons (Ashenfelter and Graddy, 2003). Ashenfelter and Graddy's (2003) study contends that an empirical discrepancy in one year can materially alter the overall rate of return by up to 5%. Campbell and Pullan (2005) also find evidence of this phenomenon for the more recent Mei & Moses All Art Index compared to the General Art Index of Art Market Research for the period 1976–2004.

In Table 4.1 we have provided a summary of the approaches to data collection, extended from an excellent survey by Ashenfelter and Graddy (2003). Average real returns are

TABLE 4.1 Estimated Art Returns and Standard Deviation as Reported by Various Papers

Author	Sample	Period	Method	Nominal Return (%)	Real Return (%)	Standard Deviation (%)
Baumol (1986)	Paintings in general	1652–1961	RSR		0.60	
Frey and Pommerehne (1989)	Paintings in general	1635–1949	Hedonic		1.40	
		1653–1987	Hedonic		1.50	5.00
		1950–1987	Hedonic		1.70	
Buelens and Ginsburgh (1992)	Paintings in general	1700–1961	Hedonic		0.91	
	Paintings in general	1780–1970	RSR	3.70	3.00[a]	
Goetzmann (1993)	Paintings in general	1716–1986	RSR	3.20	2.00[a]	5.65
		1850–1986	RSR	6.20	3.80	6.50
		1900–1986	RSR	17.50	13.3	5.19
Anderson (1974)	Paintings in general	1780–1960	Hedonic	3.30	2.60[a]	
		1780–1970	RSR	3.70	3.00[a]	
Chanel, Gerard-Varet and Ginsburgh (1996)	Paintings in general	1855–1969	Hedonic Repeat sales		4.90 5.00	
Mei and Moses (2002)	American, impressionist, and old masters	1875–1999	RSR		4.90	4.28
		1900–1986	RSR		5.20	3.72
		1900–1999	RSR		5.20	3.55
		1950–1999	RSR		8.20	2.13
		1977–1991	RSR		7.80	2.11

(*continued*)

TABLE 4.1 (continued) Estimated Art Returns and Standard Deviation as Reported by Various Papers

Author	Sample	Period	Method	Nominal Return (%)	Real Return (%)	Standard Deviation (%)
Goetzmann (1996)	Paintings in general	1907–1977	RSR		5.00	
Fase (1996)	Nineteenth century	1946–1966		11.00	7.50	
		1972–1992		10.60	1.10	
Stein (1977)	Paintings in general	1946–1968	Geometric mean	10.47		
Barre, Docclo and Ginsburgh (1996)	Great impressionist	1962–1991	Hedonic	12.0	5.00[a]	
	Other impressionist	1962–1991	Hedonic	8.00	1.00[a]	
Czujack (1997)	Picasso paintings	1966–1994	Hedonic		8.30	
Deutschman (1991)	Old masters	1971–1991		12.30	6.04	
Angnello and Pierce (1996)	Nineteenth century United States	1971–1992		9.30	3.25	
Campbell (2005)	Paintings in general	1976–2004	Average prices	5.73	1.44	8.27
	U.S. paintings	1976–2004	Average prices	7.94	3.66	8.73
Pesando (1993)	Modern prints	1977–1992	RSR		1.51	19.94
Pesando and Shum (1996)	Picasso prints	1977–1992	RSR	12.00	2.10	23.38
Frey and Serna (1990)	Old masters	1981–1988	Hedonic	10.59	3.20	
Candela and Scorcu (1997)	Modern contemporary paintings	1983–1994		3.89	0.21	

[a] Real returns estimated additionally by Ashenfelder & Graddy.

generally regarded to be significantly lower than for stocks, but higher than inflation and government bonds. Table 4.1 provides an overview of the average returns and standard deviations for the main studies cited in the literature for art price indices which have been constructed.

Behavioral aspects have implications for the cyclicality of the indices. In a boom, artworks sell quickly at prices above their reserve prices and often far above price estimates. In periods of downturn or in bust, artworks not reaching reserve prices are "bought in" without sale. These observations result in prices being less flexible downwards than buyer's offers. McAndrew and Thompson (2007) try and model the left hand tail of the distribution to produce a continuous distribution for modeling art risk for risk management purposes. The resulting illiquidity observed at times on the market has resulted in a lack of loans being provided using art as collateral. However, are the extremely high spreads observed reflective of this high liquidity risk observed in the market?

4.3 ART LENDING

At present the market for lending against art is relatively inefficient. This is partly due to the inefficient nature of the art market, and naturally the lack of liquidity in the market. This means that the use of art-backed loans is a highly risky form of loan securitization, with a low percentage of the artworks value being used as a guarantee for the loan, and also large spreads appointed to credit. In a bilateral agreement for the case of a loan using art as collateral, the bank would normally assign a higher interest rate on the loan as compensation for holding the art price risk stemming from holding art as collateral on its books. Given the highly volatile, illiquid, and transparency lacking global art market, the rate of interest on the loan would certainly occur at a premium. For an overview of art lending practices currently on offer, see Table 4.2.

TABLE 4.2 Art Lending Practices

Company	Rates	Terms	Caveat
Art Capital Group Inc.	8%–12% for bridge loans. Rates are in mid-teens where artwork is only collateral	Offers nonrecourse or pawn-shop deals, where art is used as sole collateral. Loan can be for 3 months or 3 years, depending on the situation. Loan is typically up to 50% of the low auction estimate	Art Capital Group must have verified ownership and reliable auction estimate
Sotheby's	Prime +300 bp with some flexibility	Loan is 40% of the low auction value of art or collection	Minimum loan is $1 million. With few exceptions, the company no longer gives loans to customers unless they plan to sell the art through Sotheby's
Christie's	Varies by client	Loan is up to 50% of the estimated auction value. Requires collateral of 2–2.5 times the amount of the loan	Company offers service to long-term clients and borrowers who intend to sell through Christie's
Citigroup Private Bank	Average is 225 bp above London Interbank offered rate, depending on the client	Loan is 50% of the value of the artwork. Prefers loans of more than $5 million	Bank typically requires the borrower to be current or potential client of the bank. Usually requires other assets as collateral
Bank of America Private Bank	150 to 300 bp over London Interbank offered rate	Value of loan is up to 50% of the value of artwork	Bank loans mainly to existing customers or prospects of the private bank

For example Art Capital Group appoints rates in the mid-teens for loans using art as collateral. The large spread covers the additional risk of holding art on the balance sheet, and the associated art price risk.* A risk has to be correctly accounted for in daily risk management purposes, as set out in the Basel accords. A further consequence of the greater risk inherent in art prices is that the price at which the art is valued for as collateral is likely to be significantly lower than its market value. Due to inefficient pricing in the art market, a sub-optimal amount of lending occurs in the market for asset-backed loans, when art is used as collateral. The inefficiencies from the art market are likely to be carried over to the financial sector resulting in an inefficient market for asset-backed loans incorporating art as the reference asset in the loan.

By entering into a trilateral agreement, banks are able to transfer the risk of fluctuations in the price of art—art price risk. Therefore, additional capital is not required for Basel requirements, and the only risk which the bank holds on its books is the default risk on the ACDS. The structure is conditional on the bank only entering into an agreement with a credit worthy party. Such a structure would then result in greater efficiency in the capital market for asset-backed loans.

4.4 RISK MANAGEMENT TO TRANSFER ART RISK

In managing the art risk for loans using art as collateral, there is a role for a third party to create greater efficiency in the market. As with all financial engineering, and the resulting products, there is a benefit of transferring risk away from the party not willing to hold the risk, to the party who is willing to hold this risk. One way of transferring the art risk off the banks' balance sheets is through the introduction of a credit option on the art loan.

At present the new regulations on risk management practices, from the Basel accord and Basel II mean that banks need to be able to adequately estimate all risks associated with changes in asset prices. The difficulty in being able to estimate and monitor risks associated with art price changes means that banks are unwilling to hold art price risk on their balance sheets. Since the introduction of the Basel accords, banks prefer to remove liabilities, which require a high allocation of capital. At present banks are required to hold 8% of their liabilities as capital. For more risky positions then a higher percentage is required.

4.5 ART CREDIT DEFAULT SWAPS

Credit default swaps (CDS) are contracts which provide protection on the par value of a specified reference asset, where a *protection buyer* pays a periodic fixed fee or a one off premium to a *protection seller*, in return for which the seller will make a payment on the occurrence of a specified credit event (Hull and White 2000; Chaudhry 2004). In this particular case the bank is the *protection buyer* and another third party, who has an interest

* Citigroup and Bank of America offer existing highly valued private clients a lower spread, often with other assets also required as collateral. Up to 50% of the value of the artwork is adopted as collateral.

in buying the reference asset, is the *protection seller*.* In this case the underlying asset is a specific asset, the artwork or the art collection held as collateral on the loan, commonly known as the reference asset. The third party is willing to accept the art price risk for a premium and enters into a contract with the bank which entitles him to also buy the reference asset at a set price if a credit event is triggered. Here this is the case if the reference entity, the art collector, defaults on the loan. On occurrence of the credit event, the swap contract is terminated and a settlement payment is made by the *protection seller* to the *protection buyer*. The settlement payment in this case is the exchange of the reference asset for a set termination price as specified in the contract from the third party to the bank.

Since the lender has covered his loan with his artwork as collateral, the credit event being triggered is also contingent on the price of the artwork falling below the outstanding loan payments. At the beginning of the loan agreement the value of the artwork to the bank, used as a guarantee, is the current value of the loan. This is likely to be set as a percentage of the current market valuation of the artwork.† Only if the artwork falls below this guaranteed price and the lender defaults on the loan is the credit event triggered and the protection seller has the obligation to buy the artwork at the set price. Since the value of the loan must be less than the market price for the artwork, in order for the credit event to be triggered, the bank with the long position in the ACDS is necessarily out-of-the-money. This is a necessary requirement for the third party to be obliged to fulfill his obligation on the contract and buy the artwork for the guaranteed price. The risk is transferred from the bank as long as the termination price for the artwork is set at least equal to the outstanding value of the loan.

An ACDS can be used to enable banks to transfer unwanted credit risk exposure to a third party. In this case the use of risk management techniques transfers the default risk from the loan backed by art off the balance sheet. Since the art is held as collateral the bank's assets are subject to changes in the value of the artwork, and the bank carries the art price risk. The benefit is that the bank can make a loan using the art as collateral, but could transfer the risk from holding the art as collateral. By writing a CDS on the loan, if default occurs, the bank removes the risk of carrying the art price change on its books. The bank is not required to monitor the underlying value of the art and importantly is not required to be tracked for risk management regulations stipulated in the Basel accords for capital requirements.

The basic premise is of course that the bank is able to find a counterparty for the ACDS. At present parties who would be willing to hold such a derivatives contract would be art funds, (or in the form in which they are more likely to emerge in future, art mutual funds‡), art museums, or from a more speculative disposition, by hedge funds, institutional investors, or wealthy individuals wanting to expose themselves to art price risk; willing

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* In a credit default swap "going long" is to buy the swap, where the buyer purchases protection and pays the premium. The buyer of the CDS is frequently referred to in the market as "shorting" the reference asset.

† Such guarantees are commonly used by auction houses as percentages of the market value in auction sales, commonly referred to as the reserve price.

‡ See Campbell and Pullan (2005) for an overview of the potential for the mutual art fund industry.

to pay a low premium for the small probability of being able to buy a wealthy artwork or collection at a fraction of the cost.

The main steps for the financing structure introduced here are as follows:

1. Bank issues a loan to the art collector, with the artwork as collateral. The value of the artwork is estimated, and as is currently the practice, a price is guaranteed on the art as a percentage of the current value. The bank carries the art risk on its books in lieu for giving the loan. Commonly the uncertainty in the value of the art would be reflected in a high interest rate on the loan, manifesting itself in an inefficient market for asset-backed lending.
2. Bank, not wanting to hold the risk of art price fluctuations on its books, issues an ACDS to a third party. If the reference entity (art collector) defaults on the loan the bank has the right to deliver the reference entity to the seller in exchange for its face value. This is set at the face value of the loan.
3. Bank buys protection by taking a long position in the ACDS, but actually shorts the reference asset. The bank therefore transfers the risk of holding the art as collateral in exchange for the credit risk on the ACDS. If the third party is not sufficiently rated, the bank may want to enter into a funded credit agreement, and therefore mitigate all risk on the banks books; otherwise if the party is creditworthy it is likely that the bank will be willing to carry the credit default risk of the ACDS.*
4. On the credit event being triggered the ACDS is terminated and the protection seller (third party) makes a payment to the protection buyer. In this case the bank sells the artwork(s) at the termination value, calculated at the time the contract was specified, to the third party. See Figure 4.1 for an example of the art finance structure. The default occurring is contingent on the market price of the artwork falling below the outstanding loan payments. Otherwise the art is used by the bank in its primary role as collateral, its market price able to cover the value of the outstanding loan.

Another premise for the structure to work is that the ACDS is priced correctly. The risk to the bank is now the correct pricing of the ACDS, which is substantially lower than the risk from holding the artworks on the banks books. In the following section we shall discuss pricing the ACDS.

4.6 PRICING ART CREDIT DEFAULT SWAP DERIVATIVES

In order to correctly price the ACDS, we need to determine the credit spread so that the present value of the total fee payments made by the bank equals the expected credit loss in today's terms. As is common in the literature, default probabilities and interest rates are assumed to be independent. Following Hull and White (2000), the expected loss is a function of the default probability at time t and the amount by which the face value of the loan exceeds the value of the collateral at a particular instant in time, calculated in present terms.

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* Many art museums have issued a variety of tax exempt bonds for financing solutions, requiring credit status to be acknowledged.

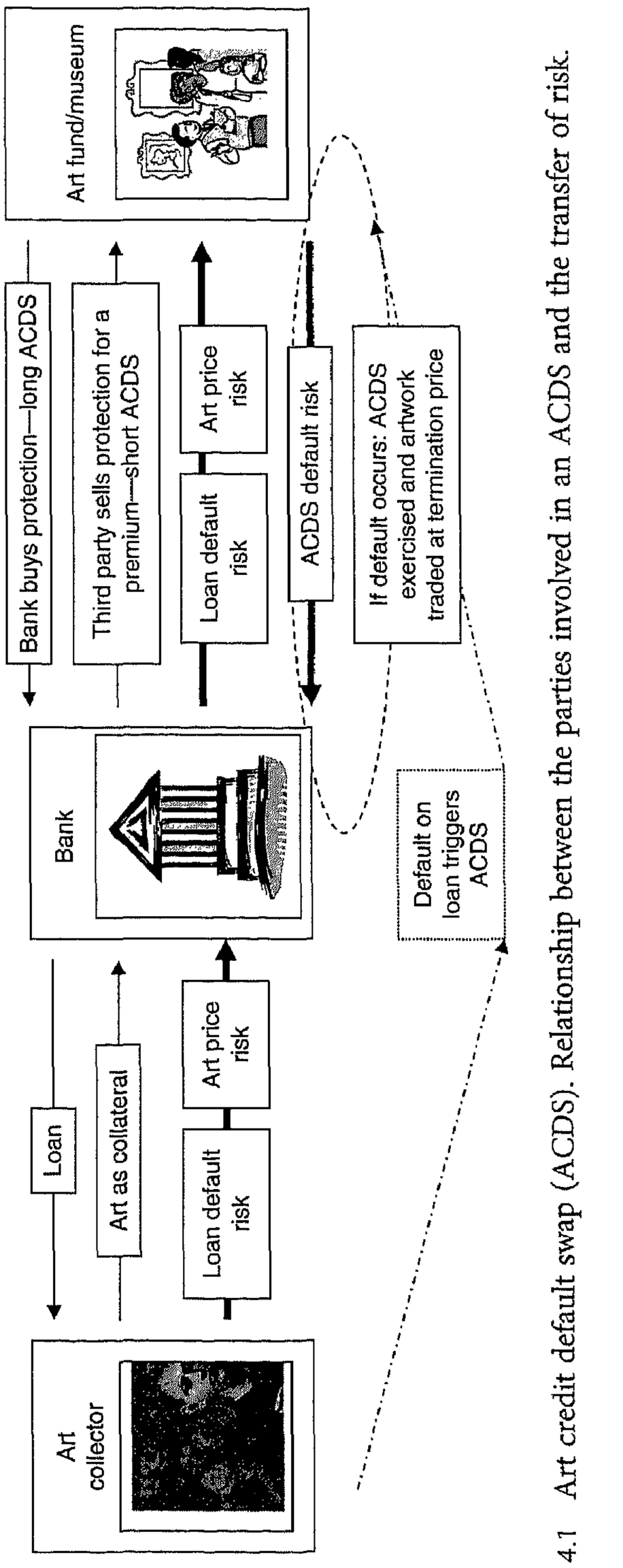

FIGURE 4.1 Art credit default swap (ACDS). Relationship between the parties involved in an ACDS and the transfer of risk.

As an example, consider a loan whose face value is set to $x\%$ of the value of the art piece or art collection at $t=0$. At present the common practice is to use a maximum of 50% of the current market price of the artwork to back the loan. The idea of this financing structure using the ACDS is to mitigate the risk of the art price falling below the loan value. We could therefore use a much higher percentage, x, even up to the full value of the artwork if the collector is of high credit quality. Equation 4.1 shows this relation,

$$P_{t=0}^{\text{Loan}} = x\%\, P_{t=0}^{\text{Art}} \tag{4.1}$$

where $P_{t=0}^{\text{Loan}}$ and $P_{t=0}^{\text{Art}}$ are the prices of the loan and art work at $t=0$, respectively.

Default is contingent on the full price of the artwork at time, t, falling below the outstanding value of the loan at time t as shown in Equation 4.2.

$$P_t^{\text{Art}} \leq P_t^{\text{Loan}} \tag{4.2}$$

From Equation 4.1 the price of the artwork is simply equal to the guaranteed percentage on the initial value of the artwork, assuming bullet repayment as shown in Equation 4.3.*

$$P_t^{\text{Art}} \leq x\%\, P_{t=0}^{\text{Art}} \tag{4.3}$$

The probability density function of default at time t required for the expected loss determination is the probability that the price of the artwork falls below the percentage of the artwork guaranteed at the initial market value of the artwork at time 0. Formally this distribution function is expressed in Equation 4.4 as $q(t)$.

$$q(t) = \text{Prob}\left(P_t^{\text{Art}} \leq x\%\, P_{t=0}^{\text{Art}}\right) \tag{4.4}$$

In the case of default, the protection seller will be required to pay the difference between the face value of the loan and current market value of the collateral plus any accrued interest to the bank. Assuming (4) to represent a risk-neutral probability density function, this can be discounted at the risk-free rate. Setting

$$v(t) = \begin{cases} e^{-r_f t}\left(\left(x\%\, P_{t=0}^{\text{Art}} - P_t^{\text{Art}}\right) + y \cdot \delta_t \cdot P_{t=0}^{\text{pLoan}}\right) & \text{if } P_t^{\text{Art}} \leq x\%\, P_{t=0}^{\text{Art}} \\ 0 & \text{if } P_t^{\text{Art}} > x\%\, P_{t=0}^{\text{Art}} \end{cases} \tag{4.5}$$

where δ_t is the year expressed as a fraction of time between 0 and 1, since the last interest payment and y is the interest rate charged on the loan to the art collector, the expected loss can be expressed by Equation 4.6.

$$\text{ECL} = \int_0^T q(t) \cdot v(t)\, dt \tag{4.6}$$

* If this happens the borrower would rationally default on the loan. Status in holding the art and reputation may result in him not actually defaulting.

As noted above, the expected credit loss (ECL) should equal the present value of the fee payments. With payments being made until default or maturity of the ACDS, whichever occurs earlier, the costs of default can be expressed as a weighted average of the two. For a maturity of T years and ω payments per year, it is straightforward to see that, in the case of no default, the present value of these payments is

$$s \cdot u(K) = \sum_{k=1}^{K} s \cdot \frac{1}{\varpi} \cdot \left(x\% \cdot P_{t=0}^{\text{Art}}\right) \cdot \mathrm{e}^{-r_f T_k} \tag{4.7}$$

where

s is the credit spread quoted on an annual basis

$T_1, \ldots, T_K$ are the fee payment dates

The probability weight corresponding to no credit event is one minus the probability of the art price falling below the face value of the loan during the duration of the ACDS and is given as π in Equation 4.8:

$$\pi = 1 - \int_0^{\mathrm{T}} q(t)\,\mathrm{d}t \tag{4.8}$$

If default occurs before maturity at time τ, the present value of the payments is the sum of the fees paid at payment dates before default and the accrued value since the last payment date T_n and the time of default:

$$s \cdot g(\tau) = \sum_{k=1}^{n(\tau)} s \cdot \frac{1}{\varpi} \cdot \left(x\% \cdot P_{t=0}^{\text{Art}}\right) \cdot \mathrm{e}^{-r_f T_k} + s \cdot \delta_t' \cdot \left(x\% \cdot P_{t=0}^{\text{Art}}\right) \cdot \mathrm{e}^{-r_f \tau} \tag{4.9}$$

with δ_t' being the year fraction since T_n.

Putting the equations together, we obtain the value of the fee payments:

$$s \cdot \left(\int_0^T q(t)g(t)\,\mathrm{d}t + \pi \cdot u(K) \right) \tag{4.10}$$

which gives, after equating fee payments in Equation 4.10 and expected credit loss in Equation 4.6, the credit spread of the ACDS, s:

$$s = \frac{\int_0^T q(t) \cdot v(t)\,\mathrm{d}t}{\int_0^T q(t)g(t)\,\mathrm{d}t + \pi \cdot u(K)}. \tag{4.11}$$

A numerical example will clarify the concept. The initial value of the art piece is assumed to be €125,000. The loan granted is set at 80% of the value of the art (P_t^{Art}) at time, $t = 0$.

The maturity of the loan is set to 5 years at a continuously compounded interest rate of 5%, which is 200 basis points above the risk-free rate. Interest is assumed to be paid at the end of each year. The ACDS is further assumed to match the loan with respect to maturity and payment dates. For the purpose of this example, suppose that annual art returns follow a normal distribution with mean 6% and a standard deviation of 15%.

In a Monte Carlo simulation 10,000 art price realizations using daily returns based on the distributional assumption are obtained. We compute the expected credit loss using Equation 4.6 and the value of the fee payments in Equation 4.10 by averaging over the credit losses and fee payments for all realizations, respectively. Dividing the former by the latter gives an ACDS spread of 20.92 basis points. This is the fair value for the protection that the bank will have to pay in order to transfer the credit risk stemming from the loan.

The spread is a positive function of the assumed variability of the art return. Figure 4.2 shows this relationship.

We assume a very simple example using an art price which is normally distributed. In this case, even with volatility at 25%, Figure 4.2 shows that simulated spreads are as low as 71 basis points. Consequently, the current spreads do not seem to be justified and point to a highly inefficient market for both banks and borrowers. To reconcile modeled credit spreads with market spreads at present, the liquidity premium must be substantial which is not accounted for in the presented model. By assuming the ratio of illiquid and liquid prices to be a fraction depending on a random number of available buyers, in line with Ericsson and Renault (2006), the model could, however, easily be extended to incorporate liquidity risk. This is an avenue for further research.

The sensitivity of the spread to changes in the maturity of the loan and ACDS contract is depicted in Table 4.3. The spread declines with increasing maturities. This can be attributed to credit events usually occurring at the beginning of the term of the loan when a negative return is more likely to cause a drop of the art price below the face value of the loan.

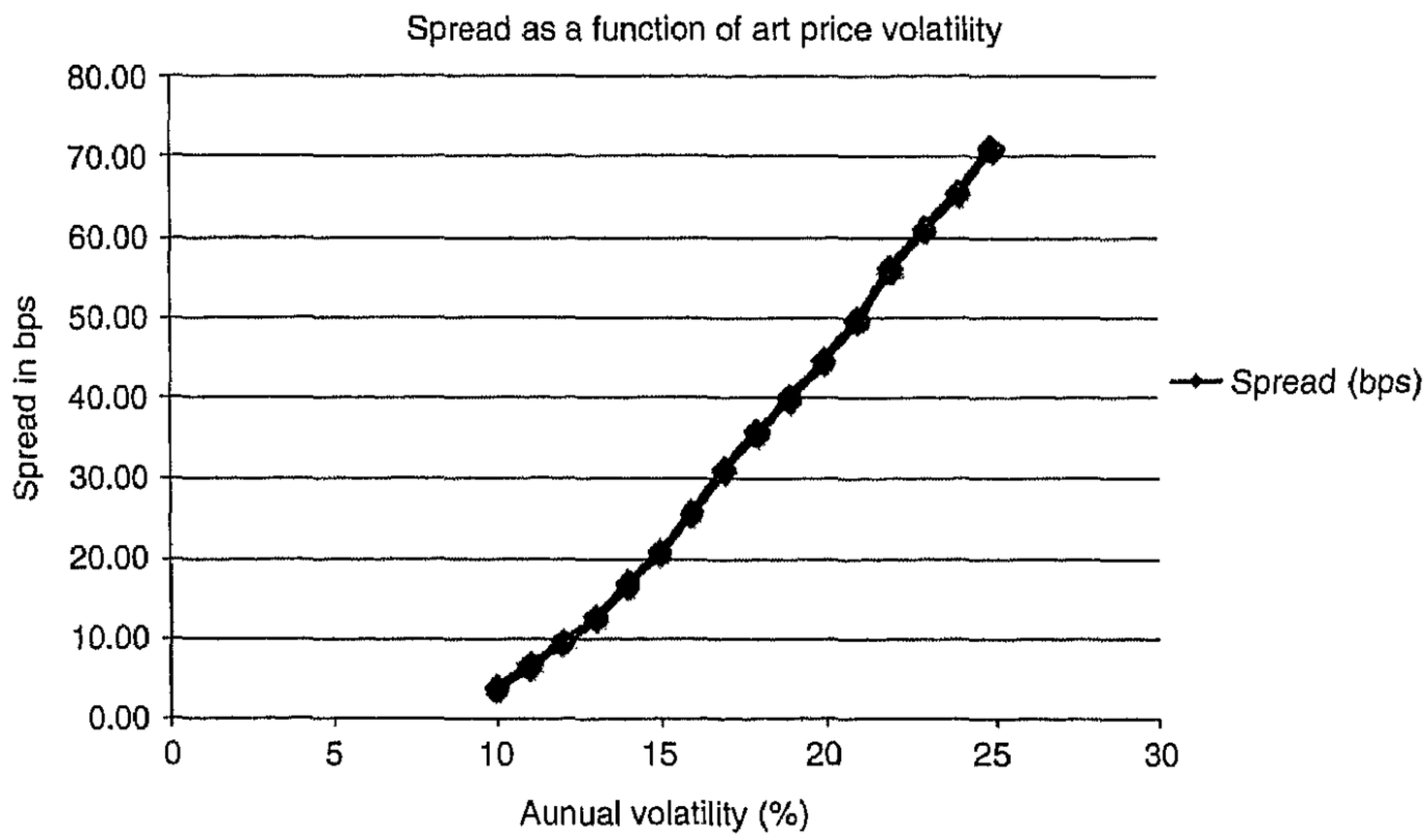

FIGURE 4.2 Credit spread as a function of art price volatility.

TABLE 4.3 Credit Spread as a Function of Maturity

Maturity (years)	Credit Spread (bps)
1	31.49
3	26.31
5	20.92
7	17.61
10	13.88[a]

[a] The simulation for 10 year maturities is based on 1000 realizations only.

4.7 CONCLUSION

Art lending and art finance are both in their infancy. However, with the demand for more asset-backed loans, involving art as collateral, and the willingness of a credit worthy third party to carry art price risk, such as through the emergence of art funds, and museums, banks are now able to transfer undesirable art price risk off its balance sheets through the use of ACDS derivative contracts. The structure presented in this chapter outlines the concept and highlights the necessary requirements for the introduction of lending against art in practice. Financial engineering improves efficiency in the banking sector, resulting in risk transfer and lower spreads paid for loans using art as collateral.

At present the market for pricing ACDSs is anywhere from mature. The simulation results have shown that the spread associated with credit risk is much lower than current practice which highlights the presence of a nonnegligible liquidity premium. This issue needs to be investigated in much greater detail. Other pricing problems which may occur due to dependent default functions are not yet relevant, however, are likely to become an issue once the market becomes more established.

Moreover, the derivatives market for art may bring the necessary liquidity to the art market which would deregulate the market and in turn fuel the move toward greater investment in art as an alternative asset class.

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