Session 2
July 11, 3:15-5:30pm

Considerations for Program and Product Design

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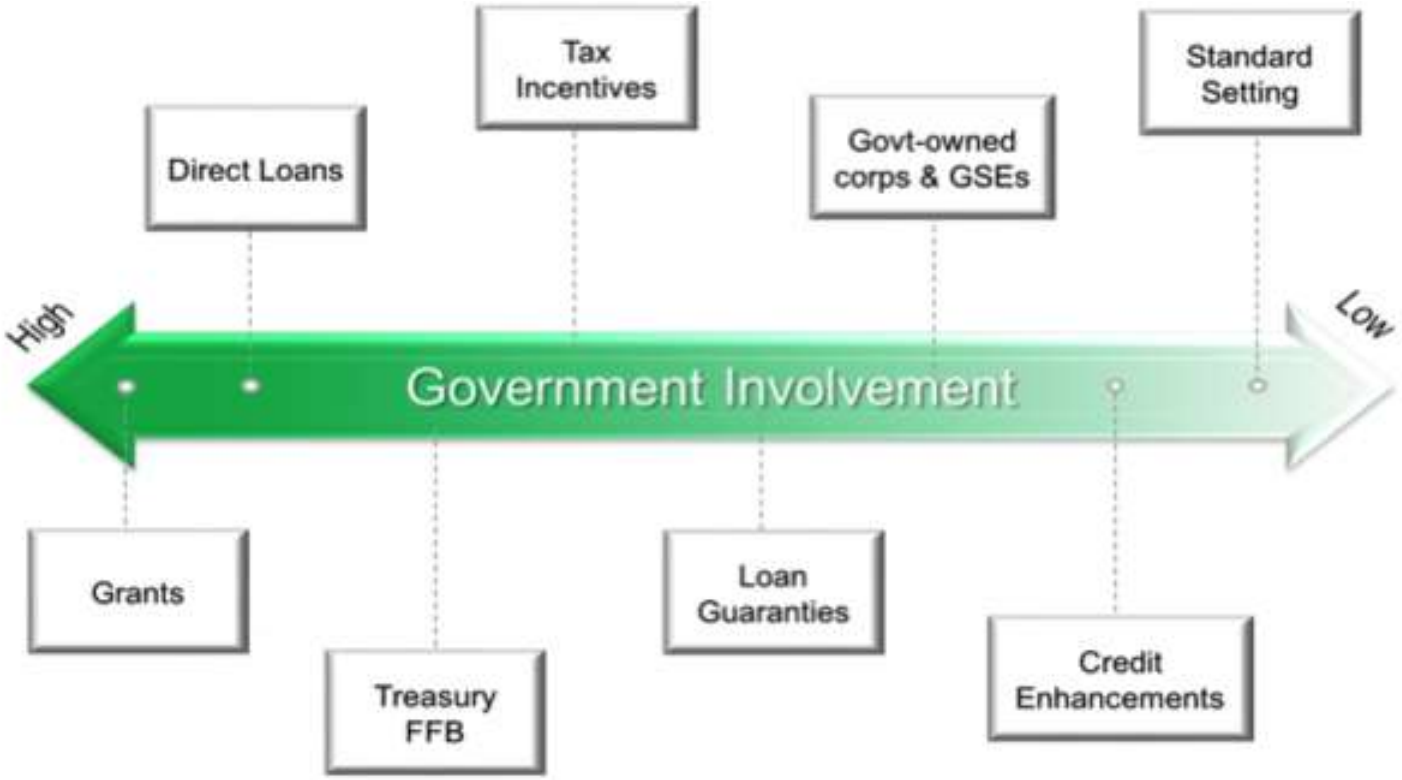
Options for structuring financial assistance



Other potential modes: convening authority, regulatory actions, technology transfer, intra-govt assistance

Cost points are highly dependent on details of initiative and move along continuum

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First step in program design: Credit or not credit?

- Credit is helpful when a large amount of funds are necessary to accomplish a goal
  - Buy a house
  - Start a business
  - Pay for a college education
- But it creates obligations that must be repaid and that can create a burden for recipients
- Alternative is grant or some other form of assistance in smaller amounts that does not require repayment
- Credit has political appeal because it looks cheap
  - In current budgetary environment, zero & negative subsidy rate credit programs have become attractive

$1B, 1-year EHLP – Key challenges

- ***Managing demand*** -- Jan 2011 - 14.5M unemployed & 4.5M borrowers delinquent but $1B EHLP can fund loans to about 40,000 borrowers
- ***Cost --*** Using judgment gained from data from a similar program operated at the state level, estimated only 3% repayment rate plus admin costs of maybe 10-15 percent, expected costs are about $1.10/dollar loaned
- ***Implementation*** -- Relied heavily on contractors to deliver program, with no time to test approach before go live
- ***Workload*** – Sought to minimize administrative expenses but needed to be nimble enough to apply resources as needed
- ***Fraud prevention*** – No traditional loan underwriting; once in, borrowers required to certify annually whether remain eligible for assistance (if hired or otherwise become ineligible for EHLP, required to notify HUD)
- ***Headline risk*** – Given above, needed plan to coordinate inquiries from the Hill, press, OMB, OIG, and other interested parties
- ***Metrics*** – How to measure success?

Once credit is the choice, how to support it?

	Grants	Direct Loans	Loan Gtys	Tax Expenditures
Inputs				
Program costs	$10,000,000	$10,000,000	$10,000,000	$10,000,000
Administrative costs	low	high	moderate	low
Potential activities supported	Revolving funds, loan loss reserves, participations, credit enhancements	Loans directly to borrowers from US government	Loans made by non-federal lenders but backed by US govt	Loans with tax breaks to borrowers, lenders and others
Amount of lending supported	Depends on program details; varies widely	Depends on subsidy rate	Depends on subsidy rate	Depends on program details; varies widely
Example 1	3 to 1 revolving fund match	Subsidy rate = 10%	Subsidy rate = 5%	Loan repayment assistance by employers
Outputs (lending stimulated)	$40,000,000	$100,000,000	$200,000,000	TBD
Outcomes (objectives achieved?)	TBD	TBD	TBD	TBD
Example 2	5% 1st loss reserve	Subsidy rate = 2%	Subsidy rate = 5%	Loan repayment assistance by employers
Outputs (lending stimulated)	TBD	$500,000,000	$200,000,000	TBD
Outcomes (objectives achieved?)	TBD	TBD	TBD	TBD

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Example program designs

	SBA	Education	HUD	USDA	HUD	Energy	Treasury - CDFI Fund
Agency Program	Small Business Investment Companies (Venture Capital)	Federal Student Aid	FHA	Rural Development	FHA	Clean Energy	CDFI Fund
Primary reason	Financial	Policy	Financial	Financial	Financial	Policy	Policy
Who championed the problem?	SBIC Trade Group	Public	Congress	Public	Congress	Administration	Administration
	The debenture structure was inappropriate for funding early stage VC deals	Accelerating college costs, decreasing state support, abuses in for-profit entities, flawed private sector lending prompted takeover	Seniors with equity in their homes but inadequate cash can use the equity to boost cash available for living and other expenses	Limited banking options for low and very low income residents in rural areas make hard to own a home, contributing to disinvestment	Following the Debt Crisis there was a need to help defaulted borrowers to get current, renegotiate their mortgage debt, and avoid foreclosure	There was a policy need to spur development of clean energy products through commercialization of innovative ideas	CDFIs with excellent financial performance cannot get long term funding due to market unfamiliarity. Fed bridges the knowledge gap but wants no risk
Product	Participating Securities	Direct Student Loans	Reverse Mortgage Insurance	502 Program	ELP	Title 17	CDFI Bond Guarantee Program

Program and product design choices

- Division of essential lending functions between agency and private partners

- Loan attributes
  - Maturity, amortization and loan size
  - Fixed vs. floating rates
  - The wisdom of indexing
  - Higher upfront fees or higher rates?
  - Embedded options: prepayment, caps and floors, deferral, forbearance, income-based repayment, consolidation, default
  - How much choice is too much?

Program and product design choices

- Other key considerations
  - Narrowly or broadly targeted?
  - How much default risk is optimal? Should pricing be risk-based?
  - Product suitability
- Choices affect
  - Success in meeting program goals
  - Gov’t costs and risks
  - Borrower cost and satisfaction

The essential credit functions

- Marketing
- Origination
- Servicing
- Funding
- Screening and monitoring
- Risk bearing
- Resolving defaults

Managing essential credit functions

- Critical decision: Which functions to perform in-house? When to use a private partner?
  - Choices have first-order impact on administrative costs, loan performance, borrower satisfaction, goal attainment, etc.
  - Apply principle of comparative advantage: who is best positioned to perform the task most efficiently and effectively?
  - Be cognizant of challenges of managing private partners

Managing essential credit functions

- Related decision: Guaranteed or direct lending?
  - Guaranteed lending usually relies more on private partners
  - But direct loan programs also use private partners
- *We'll delve into these issues more in Session 5*

Loan attributes: Maturity, amortization, and size

- Principle of matching maturity with investment horizon
- Right-sizing loans
  - As little as possible to achieve purpose
- Effects on cost, performance and risk
  - Longer maturity allows lower periodic payments.
  - Normally yield curve is upward sloping => rates charged increase with maturity. Causes increased subsidy cost, all else equal.
  - Amortization can reduce default risk by forcing orderly repayment. However, decreases affordability by increasing monthly payments
  - A larger number of small loans diversifies portfolio risk

Loan attributes: Fixed vs. floating rates

- Fixed rates from borrower perspective
  - make cash flows more predictable for borrower
  - may improve performance by avoiding affordability problems when rates rise
  - may leave borrower with above-market rate when rates fall
  - typically higher rates than on floating rate loans
- Fixed rates from lender/gov't perspective
  - may leave lender with below-market rate when rates rise
  - Can make the cash flows risky and increases cost if loan is prepayable
- *A guiding principle: Fixing a rate is not free. Do not set fixed rate horizons to be unnecessarily long.*

Loan attributes: The wisdom of indexing

- Rates can be
  - Fixed by statute
  - An index rate plus a spread that is fixed by statute
  - Set by guaranteed lenders (often with agency or statutory restrictions)
  - Set by agency (sometimes with statutory restrictions)
- Indexing links rates on new loans to current market conditions
  - E.g., 10-year Treasury + 2% on 10-year fixed rate loan
- Indexing ensures more uniform subsidies across cohorts
  - Avoids cherry-picking by private sector when statutory rates are above market rates
  - Happens automatically when competitive lenders set rates

Loan attributes: Higher upfront fees or higher rates?

- Effects of higher upfront fees and lower rates
  - Reduces implicit subsidy of high-risk borrowers by low-risk borrowers
  - May discourage some target borrowers because reduces affordability
    - Can mitigate by rolling fees into loan principal

Embedded options

- *Definition*: An **option** provides the right but not the obligation to buy or sell a security at a preset price.
  - A call option gives the right to buy
  - A put option gives the right to sell
  - Both can be valued using “options or derivative pricing models”
- Most “embedded options” in loans benefit borrowers
  - Many government credit products are actually complex financial derivatives
  - Private lenders recover cost of embedded options through higher interest rates or fees
  - Options increase the subsidy rates on gov’t loans when they are provided for free

Embedded options: prepayment

- Valuable option to borrowers with fixed-rate loans
  - Allows flexibility in timing of loan repayments
  - Can take advantage of reductions in market interest rates by refinancing
- Costly option for gov't or private lenders
  - Particularly risky on long-term loans with no prepayment penalty
  - 30-year fixed rate mortgages
    - S&L crisis; near-bankruptcy of Fannie Mae in 1980s
  - More important now for student loans with switch to fixed rates

Embedded options: caps and floors

- Caps put a ceiling on the floating rate paid
  - E.g., 1-year Treasury + 3% with a cap of 10%
  - Useful for reaping some of the cost-saving benefits of floating rates while protecting borrowers from very high rates
  - Caps increase loan cost and hence subsidy rates
- Floors put a lower bound on the floating rate paid
  - E.g., 1-year Treasury + 3% with a floor of 4%
  - Protects lender against low revenues when rates fall
  - Floors decrease loan cost and subsidy rates

Embedded options: deferral, forbearance, income-based repayment, consolidation, and default

- All these options affect the timing and/or size of cash flows to the benefit of borrowers
- Hence they increase subsidy rates and/or the rates charged by private lenders on guaranteed loans
- When embedded options have significant effects, statistics on default rates and recovery rates provide a very incomplete picture of loan performance and cost

Student Loan Consolidation Option: Historical Experience

Consolidation Volume and Estimated Cost (1998 – 2005)

Consolidation Year	Consolidation Volume (billions of $)	Consolidation Cost (billions of $)	Consolidation Cost (dollars per $100)
1998	5.6	0.0	0.17
1999	12.3	0.5	4.01
2000	10.2	-0.6	-5.44
2001	15.5	0.6	4.16
2002	26.4	2.3	8.86
2003	39.3	7.4	18.73
2004	43.8	7.0	15.92
2005	55.3	4.2	7.60

From Lucas and Moore (2012), “The Student Loan Consolidation Option”

How much choice is too much?

- Options benefit borrowers by increasing flexibility
- But offering too many options can hurt borrowers more than it helps them
  - Cost of option paid for in higher rates
  - Harder to comparison shop when different loans have different options
    - E.g., No points and 4% rate versus 1% in points and 3.75% rate
  - Cross-subsidies to borrowers who understand how to use options well from those who are unable to use them optimally
    - E.g., Home mortgage prepayment option less useful if you don't qualify for refinancing

How much default risk is optimal?
Should pricing be risk-based?

Low-risk borrowers likely to obtain credit privately

Sweet spot has moderate risk

Collection is expensive. Default harms borrowers. High-risk group is better candidates for grants.

- Risk-based pricing reduces cross-subsidies

Product suitability

- No watchdog agency with job of overseeing federal credit products
  - This leaves responsibility with Congress and Agencies
    - Exception is that CFPB oversees reverse mortgages
- Growing concerns about adverse effects of excessive indebtedness
  - For individuals and for the broader economy
    - My Uber driver and the FHA
  - E.g., student loans, mortgages

Calculation of the Financial Benefits and Who Receives Them

Loan Size						
$ 500,000		Ex-Im Working Capital Program			Global Credit Express	
Agency						
Interest					4.00%	$20,000
Fees	50%	1.50%	$3,750		2.50%	$12,500
Total Revenues			$3,750			$32,500
Interest Expense						$0
Operating Expense		0.90%	$4,500		0.75%	$3,750
Loss Expense (90% guarantee)	90%	1.25%	$5,625		2.50%	$12,500
Total Costs			$10,125			$16,250
Agency net revenues			**($6,375)**			**$16,250**
Intermediary						
Interest		4.25%	$21,250		0.00%	$0
Fees	50%	1.50%	$3,750		flat	$2,500
Total Revenues			$25,000			$2,500
Interest Expense		0.28%	$1,400		0.00%	$0
Operating Expense		3.00%	$15,000		0.05%	$250
Loss Expense (10% unguaranteed)	10%	1.25%	$625		0.00%	$0
Other					0.00%	$0
Total Costs			$17,025			$250
Intermediary net revenues			**$7,975**			**$2,250**
ROA		1.60%			Infinite	
ROE		11.39%			Infinite	
Borrower						
Actual Interest Expense			$21,250			$20,000
Actual Fee Expense			$7,500			$15,000
Actual Other Costs						
Total Costs			$28,750			$35,000
Borrower Net Cost			**$28,750**			**$35,000**
		Credit Card				
Alternative Interest		16%	$80,000			
Alternative Fees		$75	$75			
Total Alternative Borrower Cost			**$80,075**			

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Calculation of the Benefits of SBA 7a

Loan Size						
$ 500,000		Regular Bank Loan			SBA 7a	
Agency						
Interest						$0
Fees	75%				3.00%	$11,250
Total Revenues			$0			$11,250
Interest Expense					0.00%	$0
Operating Expense						$4,500
Loss Expense (75% guarantee)	75%				3.00%	$11,250
Total Costs			$0			$15,750
Agency net revenues			**$0**			**($4,500)**
Intermediary						
Interest		6.00%	$30,000		6.00%	$30,000
Fees		2.00%	$10,000		3.00%	$11,250
Total Revenues			$40,000			$41,250
Interest Expense		0.28%	$1,400		0.28%	$1,400
Operating Expense		0.75%	$3,750		1.25%	$6,250
Loss Expense (25% unguaranteed)	25%	2.00%	$10,000		2.00%	$2,500
Other (Fee to SBA)						$11,250
Total Costs			$15,150			$21,400
Intermediary net operating revenues			**$24,850**			**$19,850**
ROA			4.97%			3.97%
ROE			35.50%			28.36%
This doesn't look so good - at least in the first year -- due to the one time fees to the SBA which exceed the expected loss rate. In subsequent years, however, the SBA deal looks better: ROE of 28.37% for the SBA options versus 21.22% for the regular bank option. And that is before the sale of the guarantee below.						
Gain/(Loss) on Sale of Gty	110.0%		$0			$37,500
Intermediary net revenues			**$24,850**			**$57,350**
ROA			4.97%			11.47%
ROE			35.50%			81.93%
Borrower						
Actual Interest Expense			$30,000			$30,000
Actual Fee Expense			$10,000			$11,250
Total Costs			$40,000			$41,250
Borrower Net Cost			**$40,000**			**$41,250**
		Credit Card				
Alternative Interest		16%	$80,000			
Alternative Fees		$75	$75			
Total Alternative Cost			**$80,075**			

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Calculation of the Benefits of the CDFI Fund NMTC

Size of the Project	$ 10,000,000		PV of NMTC	$ 3,150,000		
Size of the Tax Credit	$ 3,900,000		Mkt Price	$ 3,000,000		
			Debt Incurred	$ 7,000,000		
The tax credit investor puts in $3mm of equity and borrows $7mm to buy "$10mm" of tax credits with a mkt price of $3mm. The $7mm in debt is repaid by the project being built	Conventional Development Loan			NMTC Structured Loan		
Agency						
Interest						
Fees						
Total Revenues		$0			$0	
Funding cost				0.00%	$0	
Operating cost				$5,000	$5,000	
Credit Losses						
Grant					$3,900,000	
Total Costs		$0			$3,905,000	
Agency net revenues		**$0**			**($3,905,000)**	
Intermediary (Bank)						
Interest (Sr & Sub Debt/NMTC Note A)	7.50%	$750,000		5.00%	$350,000	
Fees	3.00%	$300,000		3.50%	$245,000	
Total Revenues		$1,050,000			$595,000	
Interest Expense	0.28%	$28,000		0.28%	$19,600	
Operating Expense	3.00%	$300,000		3.00%	$210,000	
Loss Expense	3.00%	$300,000		0%	$0	
Total Expenses		$628,000			$229,600	
Intermediary net revenues		**$422,000**			**$365,400**	
Pretax ROA		4.22%			5.22%	
Pretax ROE		27.70%			38.27%	

The NMTCs are awarded at a rate of 39 cents on the dollar of investment. They are awarded over a 7 year period resulting in a present value of $3.1mm. Banks will pay 80-95 cents on the dollar in cash for them. In this example: 93.5 cents

In this example, the Conventional Development Loan is for $10 million dollars, broken down into two parts, a $7mm senior loan at 5% and a $3mm subordinated loan at 13.5%.

The NMTC Loan is broken down into two parts: a senior loan ("A") for $7mm and a quasi-equity loan ("B") of $3.0mm. Loan B is funded by the purchase of the tax credits, and the proceeds are transferred to the developer at the end of the 7 year term, typically for $1,000.

This is a Treasury based interest rate, and the interest expense is incurred by the reduction of tax revenue annually once the TCs are fully used.

The operating cost represents the cost of underwriting the Agency application

The $3.9mm is the notional dollar value of the Tax Credits awarded over a 7 year period

A Bank would not typically make both the senior and the subordinated loan but for this example it is assumed that one bank does both.

The .28% interest expense is based on the small bank rate in CHART 2.6 and is the same for all of the bank's products

The operating cost is lower for the NMTC option because some of the costs are being picked up by the investor

In this case, the bank is exposed to loss in its subordinated note in the conventional loan, but that same credit risk is absorbed by the investor in the NMTC loan

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Calculation of the Benefits of the CDFI Fund NMTC (cont.)

Project Developer					
Fees		$1,500,000			$1,250,000
Total Revenues		$1,500,000			$1,250,000
Actual Interest Expense		$750,000			$500,000
Actual Fee Expense		$300,000			$245,000
Actual Other Costs		$300,000		3.50%	$350,000
Total Costs		$1,350,000			$1,095,000
Developer net revenues		**$150,000**			**$155,000**
Funds available for construction		$ 8,500,000			$ 8,750,000
ROA		1.50%			1.55%
ROE (with equity at 15%)		10.00%			10.33%
Tax Credit Investor					
Interest received (NMTC B Note)				5%	$150,000
Fees received				0%	
Total Revenues					$150,000
Operating Expenses (Fees)				2%	$60,000
Total Costs					$60,000
Gain/Loss on Purchase of Credits					$150,000
Investor net revenues					**$240,000**
ROA					Infinite
ROE					Infinite

In this case, the Project Developer is the umbrella term for the various entities involved in purchasing, building, leasing and/or otherwise managing the property. The collective target is a net return on assets of @ 1.5%.

With the NMTC, the Project Developer in this case is also paying interest on the quasi-equity "B" Note held by the Tax Credit Investor

These are paid to the Intermediary Bank

The NMTC option carries more legal and accounting costs

This example of an NMTC loan effectively takes the element of risk out of the transaction, thereby freeing up and additional $250,000 for construction and other project costs.

Here the developer's equity goes to the predevelopment costs and the full $10mm is the hard cost of the project fully bank financed.

The TC investor in this case is charging interest on the quasi-Equity B Note as well as getting the tax credits

Operating expenses are primarily legal and accounting fees

The investor paid $10.0mm for tax credits with a present value of $3.15mm and mkt value of $3mm. The ROE for that part of the transaction is estimated at 7%

This a riskless return: once the tax credit is awarded, the investor has no further credit or operating exposure to the project and has already made a return of 4% on the purchase of the tax credits. The interest income over the next 7 years is simply extra.

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“Quick and Dirty” Unit Cost Analysis

	FINANCE COMPANY	BRB	
The cost of the loan on a per loan basis (unit cost) is one of the key tools that banks use to determine whether or not to lend to a market segment. Agencies can use it in the same way the bank uses it: to determine whether it fits within their "equity" or subsidy rate parameters. We show how, using a small business loan of $500,000 to a 5 year old battery recycling business in the Bronx, "BRB" that has an SBA credit score of 200 and whose principal owners have a combined average credit score of 710.			
Business Loan Assets	$47,880,000	$500,000	
Loan Revenues to Assets	7.50%	9.00%	This is the highest rate we think we can charge without putting the borrower at risk
Interest Expense to Assets	2.27%	2.27%	This cost is the same for all products at the lender
Operating Expense to Assets	3.67%	4.00%	Because the $500k loan is smaller than the bank's average loan, the operating cost is higher as a % to assets
Loss Expense to Assets	0.21%	1.72%	This is the loss rate for loans with a 200 SBA credit score
Total Expenses	6.15%	7.99%	
Net Profit After Tax to Assets	2.36%	1.01%	
Total Equity	$9,063,000	$9,063,000	
Capital to Assets	18.93%	18.93%	The ROE on this loan type is lower than the existing ROE so the lender has no motivation to participate.
Return on Equity	12.47%	**5.34%**	

In this example, the BRB small business loan segment might be attractive to the bank if the interest rate is raised at least to 10.36%. That is to allow for the uncertainties associated with going into a new credit segment, plus an underlying goal of generating a higher ROE than that which the lender is currently generating. But the lender will want to be sure that this higher rate is low enough to be: (a) affordable for the borrower; and (b) competitive with other lenders. The issue of competitiveness is critical: banks do not generally gravitate to "one-off" deals because of the higher cost to do them. Moreover it is hard to generate ongoing loan volume with customized transactions. These both are of particular concern in the small business arena, where growth is essential to cover the cost of what is essentially a specialized and expensive discipline.

Product Design: Suitability for the Borrower

What credit product is now available in the market? What elements of the product need to be changed to make it suitable for the target borrower?

Example: Monthly Fixed Payment of Principal and Interest for home mortgages, student loans and small business term loans

Conventional Credit Product Currently Available in the Market	Amount of the Loan	Annual Interest Rate	PMI if applicable (%)	Term in Months	Monthly Payment	Borrower Credit Score	Maximum Borrower LTV	Debt Service to Income	Borrower Annual Income $	Borrower Equity Required %	Borrower Equity Required $
Inputs	$ 250,000	4.00%	0.60%	360	$1,281.61	680	96.50%	35.00%	$ 43,941	3.50%	$ 9,067

We are inputting the minimum guidelines for a conventional loan here. For consumers, the chief focus will be the Debt to Income ratio. For small businesses it will be the debt service coverage ratio. In both asset classes, cash equity invested, LTV and collateral coverage are factors as well, but it is the monthly cash flow coverage that is the key determinant of the suitability of the loan to the borrower. The reason: the borrower's ability to pay principal and interest as scheduled is an integral feature in all loans, while the value of collateral and amount of equity only come into play for those that are foreclosed.

The Credit Product that the Target borrower needs	Amount of the Loan	Annual Interest Rate	PMI if applicable (%)	Term in Months	Monthly Payment	Borrower Credit Score	Maximum Borrower LTV	Debt Service to Income	Borrower Annual Income $	Borrower Equity Required %	Borrower Equity Required $
Target Borrower	$ 250,000	4.00%	0.60%	360	$1,281.61	600	99.50%	45.23%	34,000	0.50%	$ 1,250.00

Prior to making the loan, the lender is typically given three hard numbers: cash equity, borrower income and the amount of the loan (i.e., tuition, price of the house, needs of the business). We are going to alter that interest rate (plus PMI if it is required) and the number of months to see how much the monthly payment can be reduced to ensure a reasonable Debt Service to Income level. In a market where housing prices are rising faster than incomes, there will be pressure to increase the allowable debt service to income ratio. This should be done with care: in addition to the kinds of personal events that upset homebuyer finances, general items like rising interest rates, higher gas prices, insurance and local taxes can put pressure on the payment for consumer loans. There is an even larger range of potential threats to current payments for businesses.

There are alternatives to lowering the rate and/or extending the term. Reducing the amount of the loan is often the first step for the lender. But this may not be an optimal option from a policy standpoint. There are many communities, low income and rural for example, where the cost of building or rehabbing a house exceeds the market value and/or the capacity of local residents to buy under conventional terms.

The borrower credit score is an important indicator of the borrower's general willingness and capacity to pay. The lender can use it as an indicator of how much flexibility should be allowed in the Debt to Income, LTV and cash equity requirements.

Loan Design and Production Assumptions

CHART 2.11a Key Performance and Investment Indicators											
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Agency Performance Analysis											
Gross Loans/Commitments O/S	$109,997,304	$413,475,441	$1,408,420,577	$2,706,343,575	$4,177,390,901	$5,144,941,550	$5,763,847,578	$5,490,447,383	$5,053,597,958	$5,164,725,967	
AGENCY Surplus/Loss	$1,375,000	$6,049,336	$20,406,595	$24,297,042	$21,926,896	$1,405,650	($16,399,705)	($41,663,529)	($43,202,173)	($22,343,058)	
Agency Investment Analysis											
Cap Rate	8%										
NPV - Net Credit Losses	($214,246,531)										
NPV - Net Income	($7,712,762)										
Reprise of "Product Design" tab - INFORMATION ONLY, DOES NOT DRIVE COMPUTATIONS											
The Credit Product that the Target borrower needs	Amount of the Loan	Annual Interest Rate	PMI if applicable (%)	Term in Months	Monthly Payment	Borrower Credit Score	Maximum Borrower LTV	Debt Service to Income	Borrower Annual Income $	Borrower Equity Required %	Borrower Equity Required $
Target Borrower	$ 250,000.00	4.00%	0.60%	360	$1,281.61	600	99.50%	45.23%	34,000	0.50%	$ 1,250.00
	This is the credit product that we developed in the prior section for our target borrower. But it was a place-holder. There are several things we can do to tailor the product more precisely to the borrower's need.										
CHART 2.7b Loan Production Assumptions - THESE INPUTS DRIVE COMPUTATIONS											
Amount of the loan ($)	$ 250,000										
enter starting year of model:	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
loans made and/or guaranteed in year:	500	1500	5000	7500	10000	10000	10500	8000	7500	9500	
nount made and/or guaranteed in year:	$ 125,000,000	$ 375,000,000	$ 1,250,000,000	$ 1,875,000,000	$ 2,500,000,000	$ 2,500,000,000	$ 2,625,000,000	$ 2,000,000,000	$ 1,875,000,000	$ 2,375,000,000	

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Interest Rates and Fees

Interest Rate Index (choose 1)		Fed Funds	LIBOR	Prime	Swap	Other ST	6-Mo T Bills	10 Yr Treas	Other LT		
Today's rate (information only)								1.75%			
What index will you use for pricing loans?		10 Yr Treas									
What spread over the index will the borrower be		2%									
Will borrower's loan be fixed or floating rate?		Fixed	(click on cell and select from drop-down list)								
Rate Forecast	Starting Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	Index Rate	1.75%	2.00%	2.25%	4.00%	3.75%	2.00%	2.50%	2.50%	4.25%	4.25%
		Agency Fees %					Partner Fees %				
Fees		Origination	Servicing	Guarantee Fee Up Front	Guarantee Fee Ongoing		Origination	Servicing	Other Up Front	Other Ongoing	
		0.00%	0.00%	2.00%	0.00%		2.50%		0.00%	0.00%	
What loan structure will you use?		Level Payment	(click on cell and select from drop-down list)								
Amortization term, quarters		90	for level payment and balloon loans								
How many quarters before the balloon or bullet comes due:			for balloon and bullet loans	(for balloon loans be sure to enter a number smaller than the amortization term)							
Interest-only period, for interest-only to equal amortization loans:			for Interest-only to equal quarterly								
# quarters over which IO to equal amortization loans will amortize, after the IO period is over			for Interest-only to equal quarterly								
# quarters over which equal amortization loans will amortize			for fixed principal quarterly								

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Loan Sales

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Percent of active loan portfolio sold in year	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Investor capitalization rate (discount rate) used to value loans upon sale	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%

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Product Default Risk and Prepayment Characteristics

	Age of loan in years:									
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Probability of default:	0.25%	0.75%	2.50%	5.00%	2.00%	1.00%	0.50%	0.50%	0.50%	0.50%
Probability of prepayment:	0.50%	1.00%	2.00%	3.00%	3.00%	3.00%	3.00%	3.00%	2.00%	2.00%
	Year of Model:									
(Use this input for stress testing)	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016
Additional probability of default:	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
	Year after default:									
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
% of charge-offs recovered	5.00%	2.50%	1.25%	0.75%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
(as a percentage of the loan amount outstanding at the time of charge-off)										
	Model year:									
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Delinquency losses	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Agency loan loss reserve (% gross loans owned by agency)	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Percent of unrecovered charge-offs sold in year	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
Cents per $1 that investors will pay for unrecovered charge-offs	$ 0.60	$ 0.60	$ 0.60	$ 0.60	$ 0.60	$ 0.60	$ 0.60	$ 0.60	$ 0.60	$ 0.60

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Operating Costs

Operating costs

Operating cost per loan can be an estimate. Generally the operating cost of a loan is largest in the first year and tends to decline in subsequent years. There are exceptions to this: project finance for example, can require substantial lender involvement over the life of the loan. Delinquent and defaulted loans also generate significant costs after the first year. One of the key challenges a lender has: do revenues cover operating costs on a year to year basis - or is it necessary to keep generating more loan volume in order to do so?

# FTEs	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Marketing	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Origination	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Underwriting	3.00	5.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Closing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Servicing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monitoring	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Default Management	2.00	2.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Administration	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Total FTEs	12.00	16.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00

Annual inflation rate for operating costs	2.00%

STAFFING COSTS	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Marketing	120,000	122,400	124,848	127,345	129,892	132,490	135,139	137,842	140,599	143,411
Origination	-	-	-	-	-	-	-	-	-	-
Underwriting	75,000	76,500	78,030	79,591	81,182	82,806	84,462	86,151	87,874	89,632
Closing	-	-	-	-	-	-	-	-	-	-
Servicing	-	-	-	-	-	-	-	-	-	-
Monitoring	90,000	91,800	93,636	95,509	97,419	99,367	101,355	103,382	105,449	107,558
Default Management	80,000	81,600	83,232	84,897	86,595	88,326	90,093	91,895	93,733	95,607
Administration	60,000	61,200	62,424	63,672	64,946	66,245	67,570	68,921	70,300	71,706
Total staff costs	425,000	433,500	442,170	451,013	460,034	469,234	478,619	488,191	497,955	507,914

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Operating Costs

NONSTAFF OPERATING COSTS (OTHER THAN GRANTS)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Marketing	200,000	204,000	208,080	212,242	216,486	220,816	225,232	229,737	234,332	239,019
Origination	-	-	-	-	-	-	-	-	-	-
Underwriting	160,000	163,200	166,464	169,793	173,189	176,653	180,186	183,790	187,466	191,215
Closing	-	-	-	-	-	-	-	-	-	-
Servicing	-	-	-	-	-	-	-	-	-	-
Monitoring	240,000	244,800	249,696	254,690	259,784	264,979	270,279	275,685	281,198	286,822
Default Management	-	-	-	-	-	-	-	-	-	-
Administration	100,000	102,000	104,040	106,121	108,243	110,408	112,616	114,869	117,166	119,509
Total nonstaff operating costs	700,000	714,000	728,280	742,846	757,703	772,857	788,314	804,080	820,162	836,565

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total Operating Costs per year (you may choose to override)	1,125,000	1,147,500	1,170,450	1,193,859	1,217,736	1,242,091	1,266,933	1,292,271	1,318,117	1,344,479

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Opex as Percent of Principal Outstandin	No agency loans	No agency loans	No agency loans	No agency loans	No agency loans	No agency loans	No agency loans	No agency loans	No agency loans	No agency loans
Originations per origination FTE	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs
Originations per underwriting FTE	167	300	500	750	1,000	1,000	1,050	800	750	950
Originations per closing FTE	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs
Active loans per servicing FTE	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs	No FTEs
Annual servicing cost per active loan	-	-	-	-	-	-	-	-	-	-
Monthly servicing cost per active loan	-	-	-	-	-	-	-	-	-	-

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Exercises

EXERCISE 1

Coming out of the Debt Crisis, policymakers note that the volume of lending to newer and smaller businesses has declined. Borrowers say that they can't get loans from the banks. Banks say that they lend to every viable borrower who comes in. Data is developed (see Module 3. Program Design) that indicates a significant financing need in the market for a loan with the following characteristics:

1. Loan Size of less than $300,000
2. Loan term in excess of 25 years (to minimize monthly payment)
3. Credit Score of 170 with a credit score Loss Rate of 5.8%
4. Interest Rate of 9% or less with no fees

In order to see if the banks will be interested in providing loans like this, the policymakers approach the Large Bank (See Funding Costs above). They want to know if the bank would $200mm of these loans. The large bank does a quick analysis as follows:

Maximum Revenue	**9.00%**	
Funding Cost	0.24%	There is no change in the cost from the chart above. But this is just the cost of debt. The cost of equity is not included at this point.
Operating Cost	0.00%	There **is** a change: credit scoring would reduce the loans costs, but with the higher risk parameters, workout (exit) cost would likely triple.
Credit Losses	5.80%	The bank does not want to subsidize these higher risk "policy" loans with the low risk loans already in its portfolio. They will have to pay for themselves.
Total Expenses	**6.04%**	
Net Profit Before Tax	2.96%	
Estimated Taxes Paid	1.01%	
Net Profit After Tax	**1.95%**	This does not compare well with the 1.37% that the Large Bank gets on its portfolio as a whole.

What is the Bank's ROE equation for this new portfolio of policy loans?

Assume that the capital requirement of 8% is the same (In reality, the regulators would require a higher level of capital to reflect the higher risk of the loans - over and above the amount that is expensed as the provision).

ROE	=	LEVERAGE	X	PROFITABILITY	X	ASSET TURNOVER
Net Profit / Net Worth	=	Total Assets / Net Worth	X	Net Profit / Revenues	X	Revenues / Total Assets

What interest rate can the bank charge to achieve its existing ROE?

What operating cost level would enable the bank to achieve its existing ROE?

What is the minimum credit score that would enable the bank to achieve its existing ROE?

How much subsidy would the bank need to do these loans as presented in order to achieve its existing ROE?

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