Debt Indicators and Debt Structure in Infrastructure Finance

Project made possible through funding by:

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CLDP
COMMERCIAL LAW DEVELOPMENT PROGRAM

Public Private Partnership Authority

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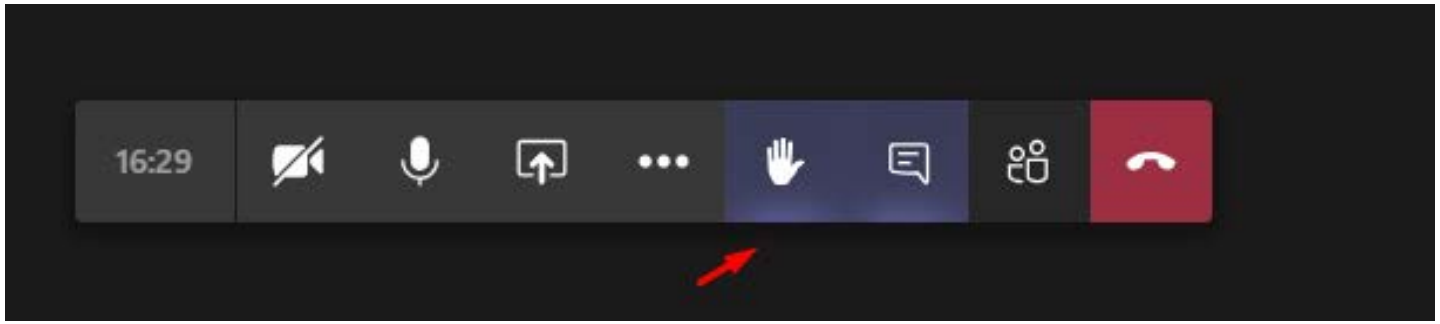
Open Floor for Questions

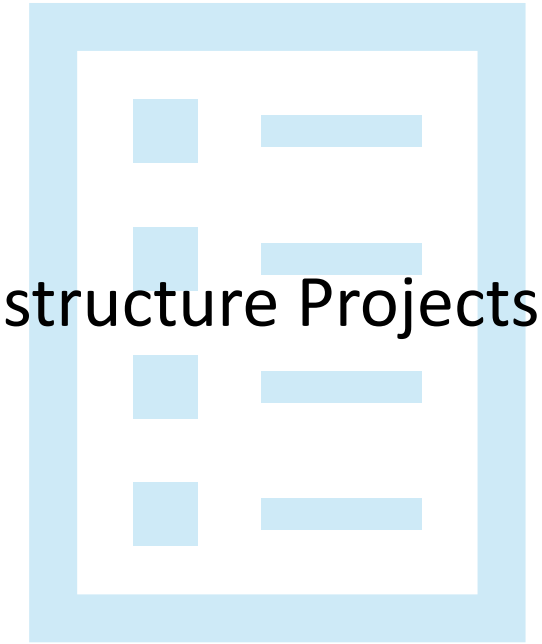
Please use the chat box to submit a question, or use the ‘raise hand’ feature. If you raise your hand, you will be invited to unmute and ask your question.



Kindly keep yourself on mute unless asking a question.

Today's Agenda

- Infrastructure Industries
- Types of Infrastructure Financing
- Private Sector Financing Options
- Why the Private Sector *Doesn't* Invest in Infrastructure Projects
- Credit vs. Equity
- Financial Liability
- Debt Service and Indicators



- Demonstration of Calculating Loan Amortization Schedule

Given rapid demographic and economic growth in many cities in Asia and around the world, investment in high quality urban infrastructure is desperately needed.

To meet business as usual, infrastructure investment requires an additional…

$3.4 to $9 trillion per year

Government revenues can finance infrastructure directly, through debt, by leveraging private sector resources with privatization of service delivery, or through various forms of Public Private Partnerships (PPPs).

Percentage of municipalities identified that identified lack of funding as a major barrier to sustainable urban growth…

55%

Infrastructure Industries

Shared characteristics amongst industries that are classified as infrastructure all over the world:

1. Considered to be central to the economy
2. Considered to be of strategic importance
3. Low risk and stable cash flows

Infrastructure Industries: Considered to be central to the economy

- Provide the impetus for the rapid growth and development of other industries as well

Infrastructure Industries: Considered to be of strategic importance

- Too many private sector players are not allowed to operate in them, creating a monopolistic market with very few players
- Investors are generally keen on investing
- Often highly regulated and the government fixes the prices that are charged

Infrastructure Industries: Low risk and stable cash flows

- Generally built in areas where there is high demand
- Either the consumers or the government are willing to pay a relatively stable cash outflow for an extended period of time

Note: Defining feature of infrastructure financing is the sectors to which money is being lent.

Types of Infrastructure Financing

Infrastructure financing has various sub-divisions, based on the type of industry that the funds will actually be utilized in:

1. Economic
2. Social
3. Commercial

1. Financing Economic Infrastructure

Infrastructure financing can be for purely economic reasons

- For instance, when a new port is built in a country, it enables more foreign trade

  - Generally funded using a public-private partnership, net positive value

  - The value created can be shared between the government and the private parties

  - Provides benefits to the larger economy of a region

2. Financing Social Infrastructure

Infrastructure funding is also given to many institutions for a social cause

- For instance, several projects are undertaken to provide clean water (or healthcare and education services) to the people
  - Undertaken regardless of the fact that they might have a negative Net Present Value (NPV)
  - Under other modes of financing, these projects would be left out
  - The government does spend funds on these projects even though there may not be any immediate returns

3. Financing Commercial Infrastructure

These projects provide benefits to a set of people that can be directly identified

- For example, toll roads and metro rail projects are considered to be commercial infrastructure projects, funded by charging the people who utilize the services

Bottom Line

- Infrastructure financing is a vast field that encompasses many industries

- Funding models used here are slightly different since projects with negative NPV are also undertaken many times

- Different types of loans such as overdraft, term loan, working capital loan, etc. are generally included in the definition of infrastructure financing

Note: It is estimated that more than $96 trillion is required to fund infrastructure projects by the year 2030. At present, the annual budget available for infrastructure funding worldwide is close to $2.5 trillion to $3 trillion. However, the actual amount of funds needed is more than double the available amount. Also, the problem is that most of this shortfall of funds exists in low and middle-income countries.

Defining Characteristics of Infrastructure as an Asset Class

- High barriers to entry
- Inelastic demand
- Economies of scale
- Tax benefits
- Long gestation period
- Low sensitivity to economic swings

Financing Options: The Private Sector

In addition to traditional loans from private banks, instruments of the private sector include:

1. Bonds (debt)
2. Public-Private Partnerships (PPPs)
3. Privatization/Divesture (equity)
4. Infrastructure Investment Funds (equity and debt)
5. Private Risk Mitigation (debt and equity)
6. City governments
7. Crowd-funding (equity or debt)

1. Bonds (debt)

City government can issue a bond to borrow money from the market to finance an infrastructure project

- If such a project provides a sufficient revenue stream the bond can be tied exclusively to the project, project bonds
- Where the bonds are to be repaid from the general revenue (and/or transfers) accruing to the city, general obligation bonds
- Together these types of city-issued bonds are called municipal bonds
- In a slightly different form, a city may “securitize” a stream of revenue such as parking fees and issue a bond backed by such receivables

1. Bonds (debt) continued…

- City governments can issues bonds for particular types of assets, green or climate bonds can encompass infrastructure assets of certain types if they fulfill certain criteria of environmental sustainability or climate change resilience (e.g. a compressed natural gas bus-way replacing pollution diesel buses and cars)
- More common in the area of social infrastructure services, city governments can issue social impact bonds, where an intermediary entity borrows money to pay for a certain infrastructure service and the government releases money to this intermediary

2. Public-Private Partnerships (PPPs)

- Range from a limited role for the private sector when it is only contracted to provide the construction or the operation of a project
- The private sector's role is larger when it comes to…
  - A lease arrangement where it operates an infrastructure asset, pays a certain fee (lease) to the government, charges users, and retains operational profits (to varying degrees)
  - A concession to build and operate and later on transfer the infrastructure asset back to the government ("BOT")
  - A concession to design, build, and operate the infrastructure asset ("DBO")

2. Public-Private Partnerships (PPPs) continued…

- Such arrangements can be based purely on the revenues derived from the asset (as in the case with some toll roads) or as an availability payment where the government pays for the infrastructure provision (performance) irrespective of its actual demand (number of user and/or user fees, which would be retained by the government)
  - Hybrid arrangements are also possible, usually involve the establishment of a Special Purpose Vehicle (SPV)
  - Moving towards partial privatization, PPPs can also be structured as joint ventures, where both public and private sector take a share in the entity building/operating the infrastructure asset

3. Privatization/Divesture (equity)

- Involves either the sale of an existing asset or, for a new asset, the agreement that the design, construction, and operation will be fully owned by a private company. In this case, the government has no direct share.
- Government will normally have legislative, regulatory, or administrative mechanisms that govern the operation of the infrastructure asset ensuring the public interest is served.

4. Infrastructure Investment Funds (equity/debt)

- Through equity investments, city governments can attract private investors to take a share in an infrastructure project, usually in a Special Purpose Vehicle (SPV) or a Joint Venture (JV) company
- Potential investors include:
  - Specialized infrastructure equity funds that pool investments in infrastructure in specific sectors and regions; and
  - Institutional equity funds that seek long-term, sustainable investments, which mature infrastructure asses usually are, for pension funds, insurance companies, endowments, as well as sovereign (government) wealth funds

5. Private Risk Mitigation (debt and equity)

- There are numerous instruments to decrease the cost of infrastructure project finance by lowering the risk profile of such investment
  - Structure equity into tiers with the provision of a high risk, first loss tier of capital that will be used first to cover for losses in an infrastructure project to a certain defined amount.
  - Intermediate or mezzanine finance is a form of quasi-equity capital, as it ranks between a project's senior debt and equity—it receives higher returns on investment, as it takes higher risks, but in case of losses it also is repaid only after senior debt
  - Convertible debt, which is an initially borrowed amount of money that changes from debt into equity shares of the infrastructure asset at a defined point in time.
    - When the project is up and running, thereby providing potential return on investment at a later stage

6. City governments

Can also decrease the risk profile of their projects by:

- Insuring (hedging) it against various commercial risks, such as liquidity shortages and interest rate changes, or political and environmental risks such as regulatory changes or natural disasters
- Providing enhancement to the financing institution, thereby reducing the cost of finance (the interest rate), through various forms of credit enhancement and guarantees

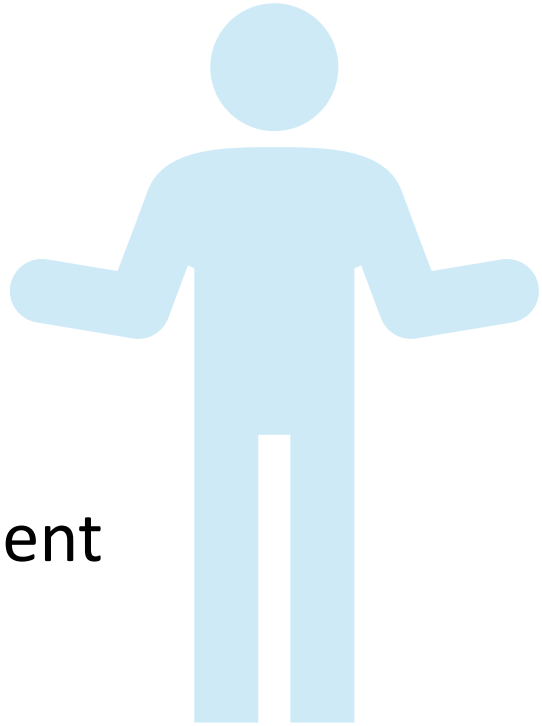
7. Crowd-funding (equity or debt)

- Still rather uncommon instrument in infrastructure financing
- Allows for the contribution of small amounts by individuals into an infrastructure project of particular interest to the public

Discussion

Why doesn't the private sector invest in infrastructure projects?

1. Lack of project pipelines
2. Lack of controls
3. Lower adjusted rate of return
4. Unstable regulatory environment
5. High transaction costs



1. Lack of project deadlines

- The identification of viable financial projects, which can be pitched to the private sector, is a significant problem.
- Developing countries fail to identify infrastructure projects which are financially viable.
- Even in developed countries i.e., the G-20 countries, less than 50% have a formal mechanism in place to identify projects that need to be pitched to global investors.

2. Lack of controls

- The private sector can only help if they receive some surety that their capital will be protected once they make the investment.

- The problem is that a lot of time investments have to be made in countries where there is a significant law and order problem.

3. Lower adjusted rate of return

- Governments claim that infrastructure projects have very little risk

- However, private investors have a different point of view
  - Projects and investments made by the private sector have got stuck due to change in government policies
  - Many infrastructure projects have significant legal hurdles
  - In many cases, land acquisitions get significantly delayed, and environmental clearances are hard to come by
  - The gestation period of the project gets prolonged, and the returns do not increase proportionately - reducing the annualized yield for the project.
  - The lower IRR's provided by the government are not very attractive for the private sector in the absence of any special tax incentives.

4. Unstable Regulatory Environment

- A lot of investor demand for infrastructure projects is created by providing tax incentives
- Banks are also given certain concessions in their capital adequacy ratios if they invest in infrastructure projects
- However, the problem is that if the demand can be created by policies, it can also be taken away by a change in the policies
- Investors are quite aware of the possible impact.

5. High transaction costs

- Private investors have to pay up a lot of money to obtain the right to work on an infrastructure project
  - For other investment classes, the transaction cost hovers around 2% of the project cost. However, in the case of infrastructure projects, the transaction cost may go as high as 10%
    - A lot of advisory fees, lawyer fee, and the officials' time has to be invested in bidding for a project
    - Eat into the annualized return making the project less viable

Credit vs. Equity

- Creditor of a commercial loan to an entity/corporation – traditionally a bank - is legally entitled to receive cash.
- Issuer of the liability is obliged to pay to the creditor (liability in accounting term or debt (and other payables) in statistical terms)
- Entity/Company that issued equity instruments does ***not*** have any contractual obligation to pay cash.
- Shareholders are ***not*** entitled to put back their shares to the entity and ask for cash or cash equivalent.
- Holder of an equity instrument has only right to the residual interest in net assets (assets minus all liabilities excluding own equity) of the company.

Financial Liability

1. Contractual obligation to:
   - Deliver cash or another financial asset to another entity; **or**
   - Exchange financial assets or financial liabilities with another entity under conditions that are potentially unfavorable to the entity; **or**

2. Contract that will or may be settled in the entity's own equity instruments and is:
   - A non-derivative for which the entity is or may be obliged to deliver a variable number of the entity's own equity instruments; **or**
   - A derivative that will or may be settled other than by the exchange of a fixed amount of cash or another financial asset for a fixed number of the entity's own equity instruments.

Note: The entity's own equity instruments do not include instruments that are themselves contracts for the future receipt or delivery of the entity's own equity instruments.

Debt Service Concepts

- **Debt service:** the interest and principal payments due in a given year on long-term debt.

- **Debt-service ratio:** the interest and principal payments/exports of goods and services (in a given year on long-term debt).

Debt Indicators

- Debt indicators can be compiled in various different ways and can be used for many purposes.
- Most common use of debt indicator is the assessment of the vulnerability and financial stability of the indebted entity.
- Common questions asked in respect of debt indicators:
  - Will the entity be able to repay its obligation (solvency and liquidity)?
  - Is the level of indebtedness sustainable?
  - Did the entity get sufficient financing in order to achieve its economic goals?
  - What is the impact of indebtedness on the vulnerability?
- While the first two questions can be asked only for debt instruments the last two issues can also be interpreted in a broader sense where the debt or equity nature of the instrument is not relevant.

Questions and Comments?

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Loan Amortization Schedule

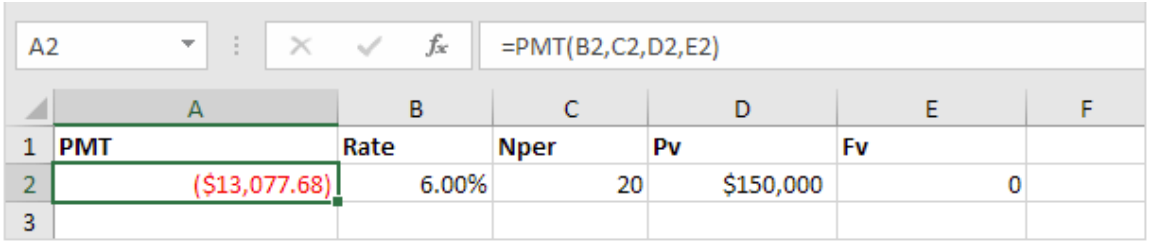
Payment Examples:

- Annual Payments
- Quarterly Payments

Payment (PMT) Example

Consider a loan with an annual interest rate of 6%, a 20-year duration, a present value of $150,000 (amount borrowed) and a future value of 0 (that's what you hope to achieve when you pay off a loan).

- The PMT function below calculates the annual payment.



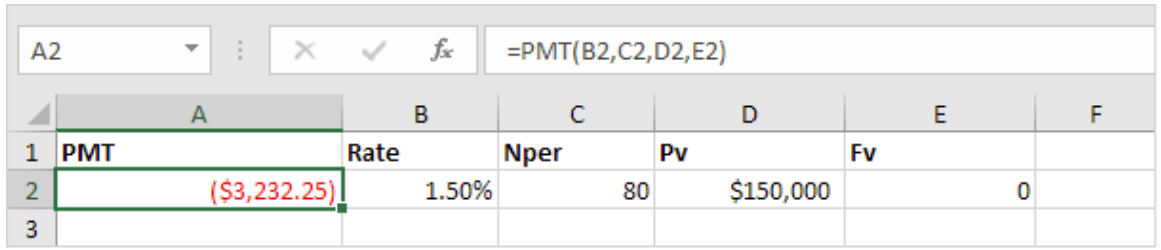
	A	B	C	D	E	F
1	PMT	Rate	Nper	Pv	Fv	
2	($13,077.68)	6.00%	20	$150,000	0	
3						

Note: if the fifth argument is omitted, it is assumed that payments are due at the end of the period. We pay off a loan of $150,000 (positive, we received that amount) and we make annual payments of $13,077.68 (negative, we pay).

Payment (PMT) Example

Consider a loan with an annual interest rate of 6%, a 20-year duration, a present value of $150,000 (amount borrowed) and a future value of 0 (that's what you hope to achieve when you pay off a loan).

- The PMT function below calculates the quarterly payment.



	A	B	C	D	E	F
1	PMT	Rate	Nper	Pv	Fv	
2	($3,232.25)	1.50%	80	$150,000	0	
3						

*Note: we make quarterly payments, so we use 6%/4 = 1.5% for Rate and 20*4 = 80 for Nper (total number of periods).*

Loan Amortization Schedule

1. Calculate a Monthly Payment
2. Calculate Principal Part of the Payment
3. Calculate Interest Part of the Payment
4. Update the Balance
5. Change the Balance Formula
6. Create the Schedule

Here, we use the PMT function to calculate the monthly payment on a loan with an annual interest rate of 5%, a 2-year duration and a present value (amount borrowed) of $20,000.

=PMT(AnnualInterestRate/PaymentsPerYear,Years*PaymentsPerYear,Amount)

	A	B	C	D	E	F
1	Annual Interest Rate	5.00%				
2	Years	2				
3	Payments Per Year	12				
4	Amount	$20,000				
5						
6	**Payment Number**	**Payment**	**Principal**	**Interest**	**Balance**	
7	1	($877.43)				
8						

Note: We could use "named ranges" for the input cells.

Loan Amortization Schedule

1. Calculate a Monthly Payment
2. Calculate Principal Part of the Payment
3. Calculate Interest Part of the Payment
4. Update the Balance
5. Change the Balance Formula
6. Create the Schedule

Use the PPMT function to calculate the principal part of the payment. The second argument specifies the payment number.

=PPMT(AnnualInterestRate/PaymentsPerYear,A7,Years*PaymentsPerYear,Amount)

	A	B	C	D	E	F
1	Annual Interest Rate	5.00%				
2	Years	2				
3	Payments Per Year	12				
4	Amount	$20,000				
5						
6	**Payment Number**	**Payment**	**Principal**	**Interest**	**Balance**	
7	1	($877.43)	($794.09)			
8						

Loan Amortization Schedule

1. Calculate a Monthly Payment
2. Calculate Principal Part of the Payment
3. Calculate Interest Part of the Payment
4. Update the Balance
5. Change the Balance Formula
6. Create the Schedule

Use the IPMT function to calculate the interest part of the payment. The second argument specifies the payment number.

=IPMT(AnnualInterestRate/PaymentsPerYear,A7,Years*PaymentsPerYear,Amount)

	A	B	C	D	E	F
1	Annual Interest Rate	5.00%				
2	Years	2				
3	Payments Per Year	12				
4	Amount	$20,000				
5						
6	**Payment Number**	**Payment**	**Principal**	**Interest**	**Balance**	
7	1	($877.43)	($794.09)	($83.33)		
8						

Loan Amortization Schedule

1. Calculate a Monthly Payment
2. Calculate Principal Part of the Payment
3. Calculate Interest Part of the Payment
4. Update the Balance
5. Change the Balance Formula
6. Create the Schedule

Update the balance

=Amount+C7

	A	B	C	D	E	F
1	Annual Interest Rate	5.00%				
2	Years	2				
3	Payments Per Year	12				
4	Amount	$20,000				
5						
6	**Payment Number**	**Payment**	**Principal**	**Interest**	**Balance**	
7	1	($877.43)	($794.09)	($83.33)	$19,205.91	
8						

Loan Amortization Schedule

1. Calculate a Monthly Payment
2. Calculate Principal Part of the Payment
3. Calculate Interest Part of the Payment
4. Update the Balance
5. Change the Balance Formula
6. Create the Schedule

Select the range A7:E7 (first payment) and drag it down one row.

Change the balance formula.

=E7+C8

	A	B	C	D	E	F
1	Annual Interest Rate	5.00%				
2	Years	2				
3	Payments Per Year	12				
4	Amount	$20,000				
5						
6	**Payment Number**	**Payment**	**Principal**	**Interest**	**Balance**	
7	1	($877.43)	($794.09)	($83.33)	$19,205.91	
8	2	($877.43)	($797.40)	($80.02)	$18,408.50	
9						

Loan Amortization Schedule

	A	B	C	D	E	F
1	Annual Interest Rate	5.00%				
2	Years	2				
3	Payments Per Year	12				
4	Amount	$20,000				
5						
6	**Payment Number**	**Payment**	**Principal**	**Interest**	**Balance**	
7	1	($877.43)	($794.09)	($83.33)	$19,205.91	
8	2	($877.43)	($797.40)	($80.02)	$18,408.50	
9	3	($877.43)	($800.73)	($76.70)	$17,607.78	
10	4	($877.43)	($804.06)	($73.37)	$16,803.71	
11	5	($877.43)	($807.41)	($70.02)	$15,996.30	
12	6	($877.43)	($810.78)	($66.65)	$15,185.53	
13	7	($877.43)	($814.15)	($63.27)	$14,371.37	
14	8	($877.43)	($817.55)	($59.88)	$13,553.82	
15	9	($877.43)	($820.95)	($56.47)	$12,732.87	
16	10	($877.43)	($824.37)	($53.05)	$11,908.50	
17	11	($877.43)	($827.81)	($49.62)	$11,080.69	
18	12	($877.43)	($831.26)	($46.17)	$10,249.43	
19	13	($877.43)	($834.72)	($42.71)	$9,414.71	
20	14	($877.43)	($838.20)	($39.23)	$8,576.51	
21	15	($877.43)	($841.69)	($35.74)	$7,734.81	
22	16	($877.43)	($845.20)	($32.23)	$6,889.62	
23	17	($877.43)	($848.72)	($28.71)	$6,040.89	
24	18	($877.43)	($852.26)	($25.17)	$5,188.64	
25	19	($877.43)	($855.81)	($21.62)	$4,332.83	
26	20	($877.43)	($859.37)	($18.05)	$3,473.45	
27	21	($877.43)	($862.96)	($14.47)	$2,610.50	
28	22	($877.43)	($866.55)	($10.88)	$1,743.95	
29	23	($877.43)	($870.16)	($7.27)	$873.79	
30	24	($877.43)	($873.79)	($3.64)	($0.00)	
31						

M… Update the Balance → 5. Change the Balance Formula → 6. Create the Schedule

Create the Schedule - Select the range A8:E8 (second payment) and drag it down to row 30.

Note: It takes 24 months to pay off this loan. See how the principal part increases and the interest part decreases with each payment.

Questions and Comments?

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