



Achieving High N^2 : The Benefits and Challenges of Trading with Strangers

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Introductory Comments

- Civilization is about relating well with others.
- Relations among strangers are most difficult.
- Economic growth requires reliable contracting among strangers.
- Well developed economies have efficient systems to find, write and enforce contracts among strangers.
- Emerging markets that improve these systems will grow faster.

Confession and Charge



- You already may know the principles that I will present today.
 - But perhaps not their application to wedding receptions!
- I hope that you find that their organization, generalization, and presentation useful.
- As I discuss the benefits and challenges of trading with strangers, consider how these issues affect growth in emerging markets.
 - Their importance cannot be overstated or expressed too often.



Agenda

- Overview of trading
- Review of why trading is beneficial
- The search for liquidity
- Counterparty risk
- Solutions to settlement problems
- Public policy implications



Overview of Trading



Trades in General

- Trade occurs when two traders exchange something for something else.
 - The trade may be for cash or barter.
- The item traded may be unique or fungible.
- The trade may settle immediately or may involve commitments to make future payments, deliveries of goods, or provision of services.
 - Future settlements can be problematic.



Examples of Traded Items

- Financial instruments
- Goods and properties
- Services



Trades and Contracts

- A voluntary trade is an agreement and thus is a contract between the two parties.
- I will use the words trade and contract synonymously.
- Legal contracts involve concepts of reliance and consideration that I won't discuss today.
- Don't rely on me for legal advice!



Financial Instrument Examples

	Settlement Timing	
	Spot	Future commitments
Fungible	Currencies Precious metals Seasoned bonds, stocks, and funds	Futures contracts Exchange-traded options and swaps contracts
Unique	Existing mortgages Seasoned bank loans Venture capital Private capital	OTC contracts Bank loan originations Mortgage originations Initial debt offerings and IPOs Insurance contracts

Goods and Properties Examples



	Settlement Timing	
	Spot	Future commitments
Fungible	Retail sales goods (new cars, groceries) Industrial commodities	Produced commodity goods
Unique	Artwork Used cars and other vehicles Used machinery	Real estate parcels Goods made to order Leased equipment

Traded Services Examples



	Settlement Timing	
	Spot	Future commitments
Fungible	Day labor Maintenance services like car washes Taxi services	Contract labor Delivery services Airline travel
Unique	Personal services	Professional services Apartments for rent Maintenance contracts



Review of Why Trade Is Beneficial



Voluntary Trade Is Beneficial

- Presumably, the buyer values the item more than does the seller, so both are better off.
- Buyers who value the item most should trade with sellers who value it least.
 - This rule maximizes the gains from trade.
- Traders naturally enforce this rule when buyers look for the lowest prices and sellers look for the highest prices.



Trade Lowers Production Costs

- The lowest price seller of produced goods generally is the producer who can produce at the lowest cost.
- Lowest cost means the least use of valuable resources.
- Sales by lowest cost producers minimize total use of resources and thus benefits the whole society.



Multi-component Products

- When production requires the assembly of multiple components or the application of multiple processes (essentially everything does), trade allows producers to specialize in components and processes for which they are most efficient.
- Specialization lowers production costs, so that end consumers are better off.



Determinants of Prosperity

- Free trade

Other determinants not in today's talk (in decreasing order of importance):

- Physical security of persons and property
- Productive know-how
- Natural resources



The Three Main Impediments to Trade

1. Finding suitable counterparties
2. Counterparty risk

These two problems involve trading with strangers.

Another impediment not in today's talk:

3. Government impediments
 - Tariffs, taxes, quotas, and unnecessary regulations



Trading with Strangers



Overview

- Consolidation helps traders find counterparties.
- But strangers must be willing to trade with each other.



Network Value (Why N^2 Matters)

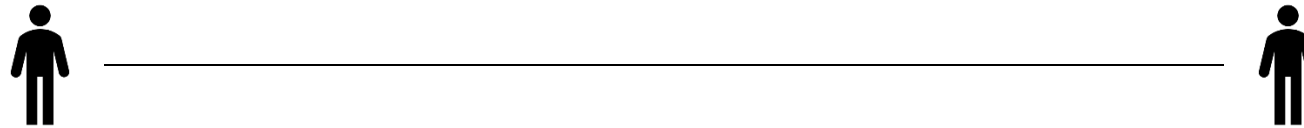
The number of potential trades grows with the square of the number of traders.

No Trades Are Possible With Only One Trader



No possible trades

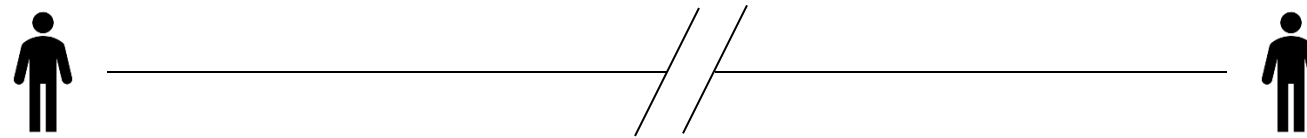
1 Potential Trade with 2 Traders



$1 = 0 + 1$ potential trade



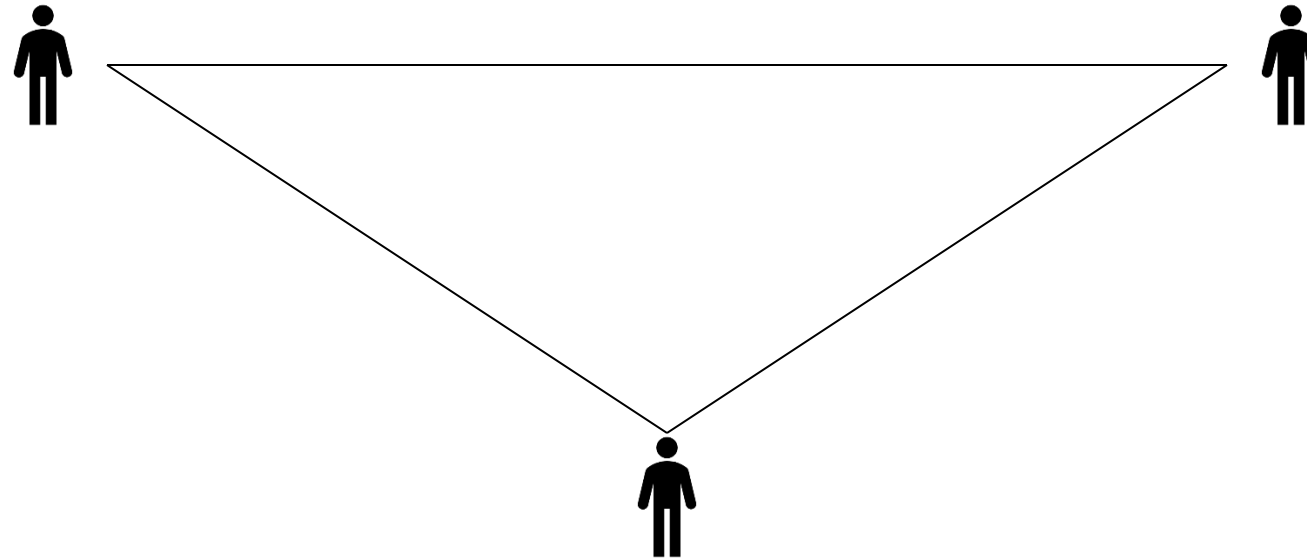
Why Potential Trades May Not Occur



One or both traders

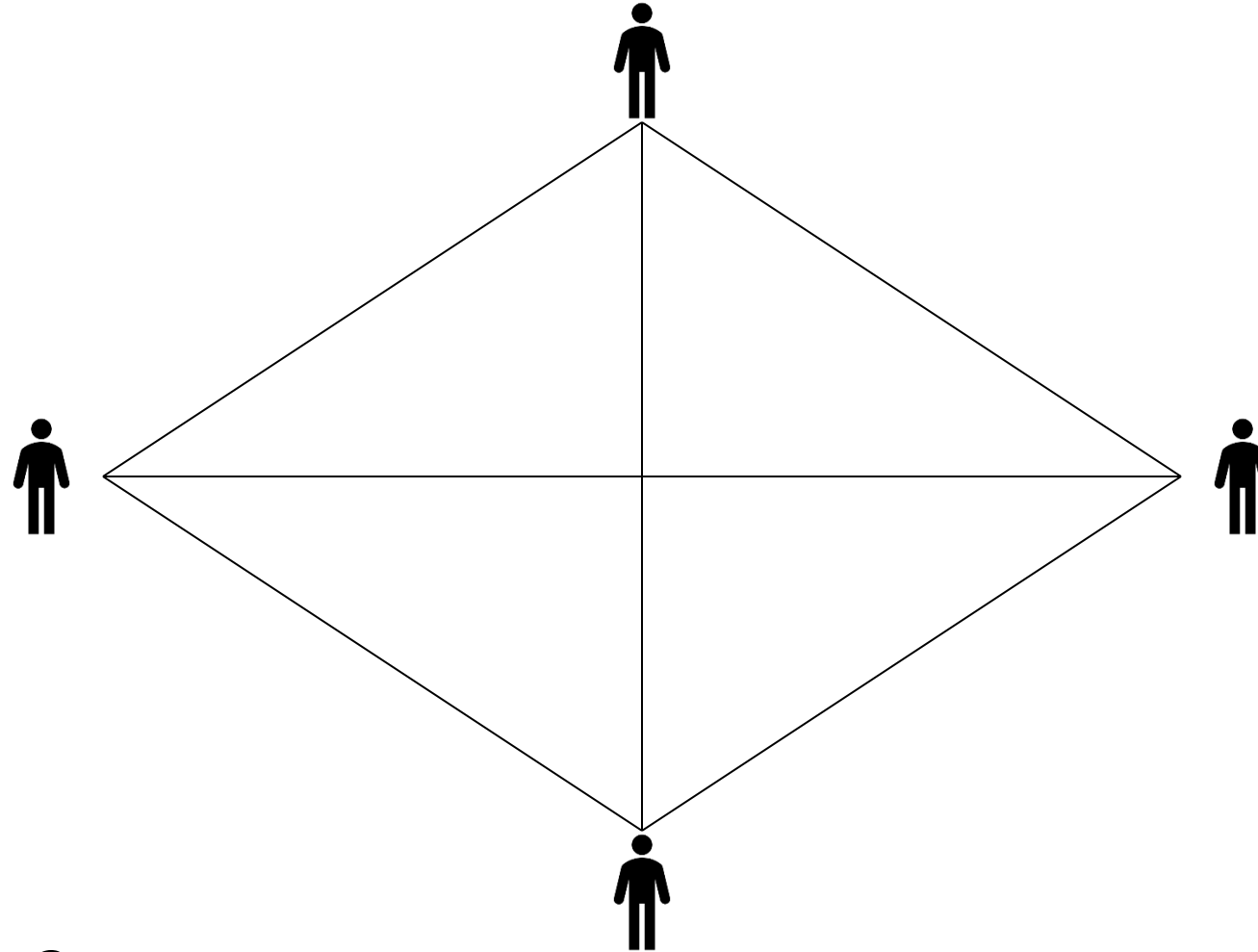
- May not be interested in trading.
- May not know about the potential trade.
- May not trust that the counterparty will settle the trade.

3 Potential Trades with 3 Traders



$$3 = 0 + 1 + 2$$

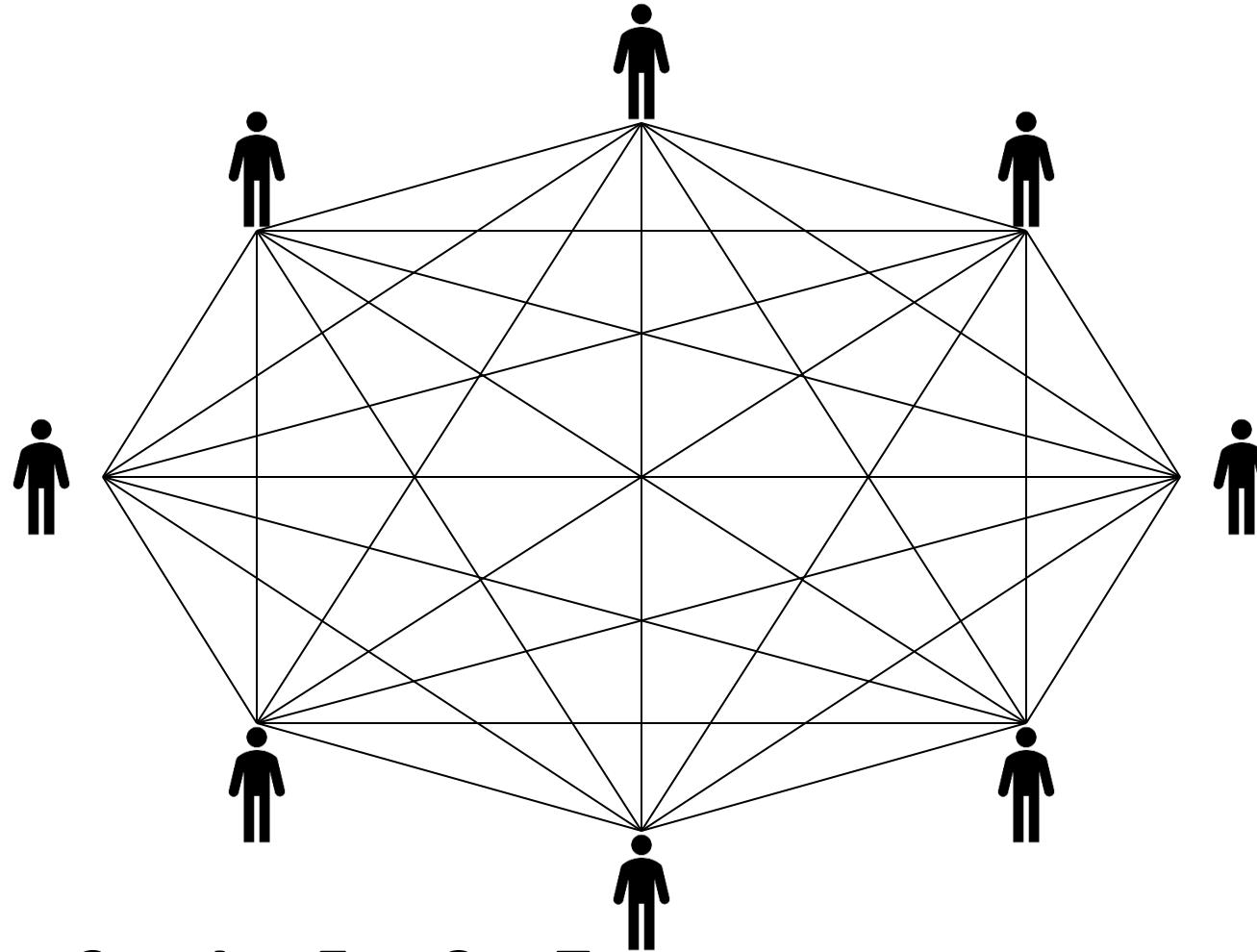
6 Potential Trades with 4 Traders



$$6 = 0 + 1 + 2 + 3$$



28 Potential Trades with 8 Traders



$$28 = 0 + 1 + 2 + 3 + 4 + 5 + 6 + 7$$



Potential Trades Grow Quickly

- With N traders, the number of potential trades is

$$\frac{N \times (N - 1)}{2}$$

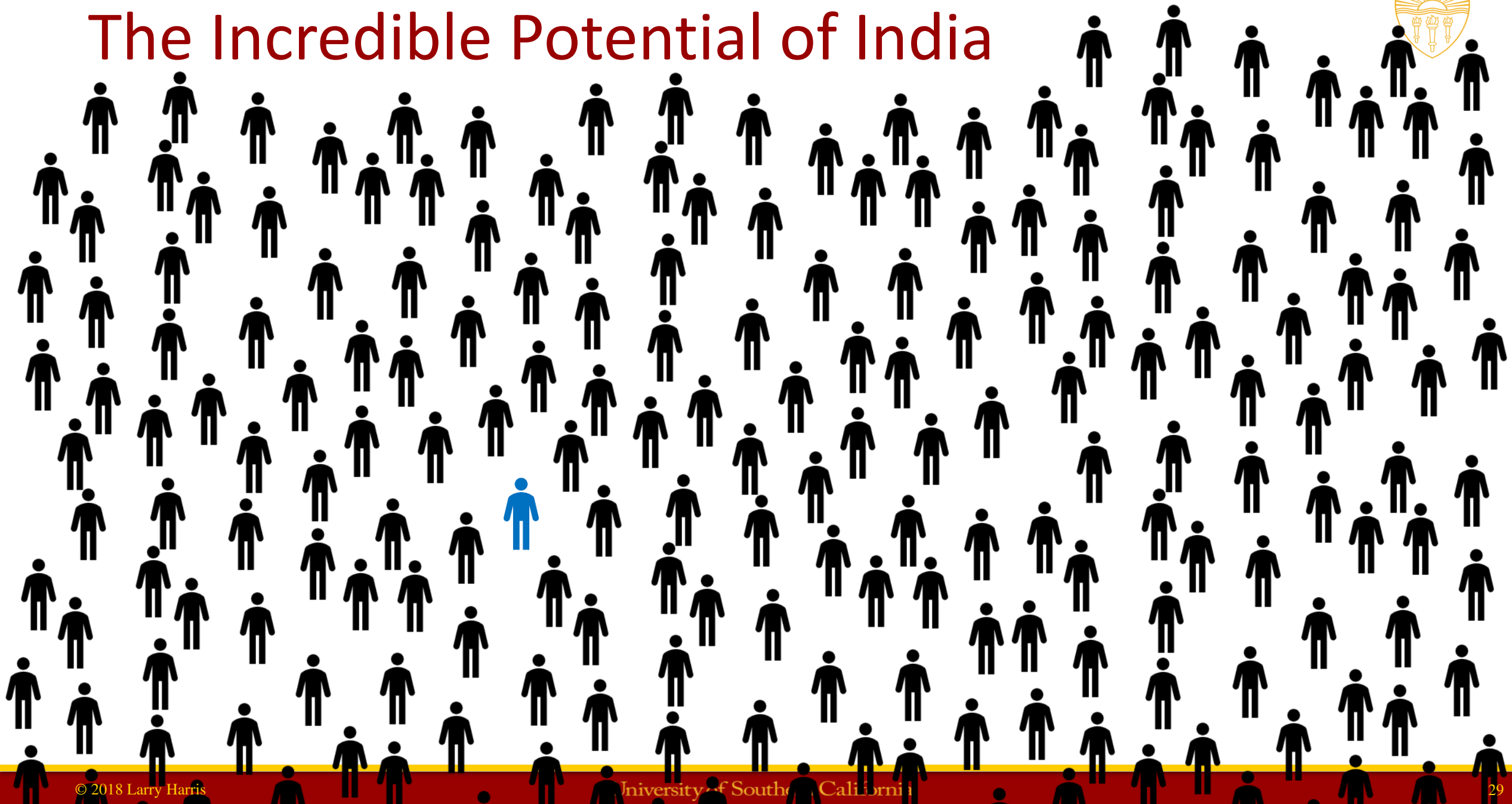
- For large N , this number is proportional to N^2 .



Benefits of Trading

- For a potential beneficiary of trading, the probability of trading increases with the number of potential counterparties.
- For the whole economy, the benefits of trading grow with this number because
 - More people could benefit from trading (obviously).
 - The potential beneficiaries more likely can trade.

The Incredible Potential of India





The Search for Liquidity

Liquidity



- Liquidity is the ability to trade what you want to trade, when you want to trade, and at low transaction cost.
- We normally think of liquidity in financial markets, but the concept also applies to the trading of goods and services.

The N^2 Lesson



- Economies benefit when traders can easily find each other and trade.
- Brokers, exchanges, marketplaces, bulletin boards, advertising, and conferences help traders find each other.
- Finding each other is easiest when everyone interested in trading gathers at the same place and time.



Increasing N^2 in Financial Markets

- Markets are most liquid when everyone is willing to trade the same instrument.
- Great liquidity can make a less-than-perfect instrument attractive to many traders.
- Instruments designed to appeal to many different interests are most successful.
 - Standardized futures contracts
 - ETFs



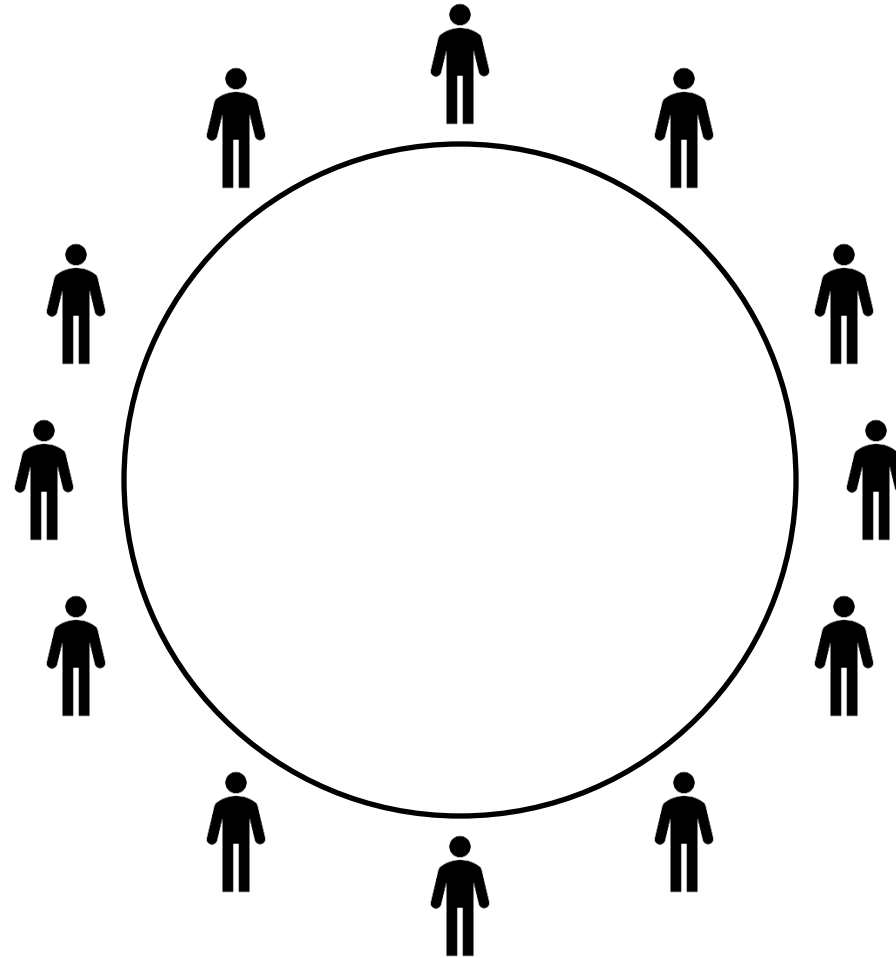
A Digression: Tables at Wedding Receptions

Are round tables or long tables best?



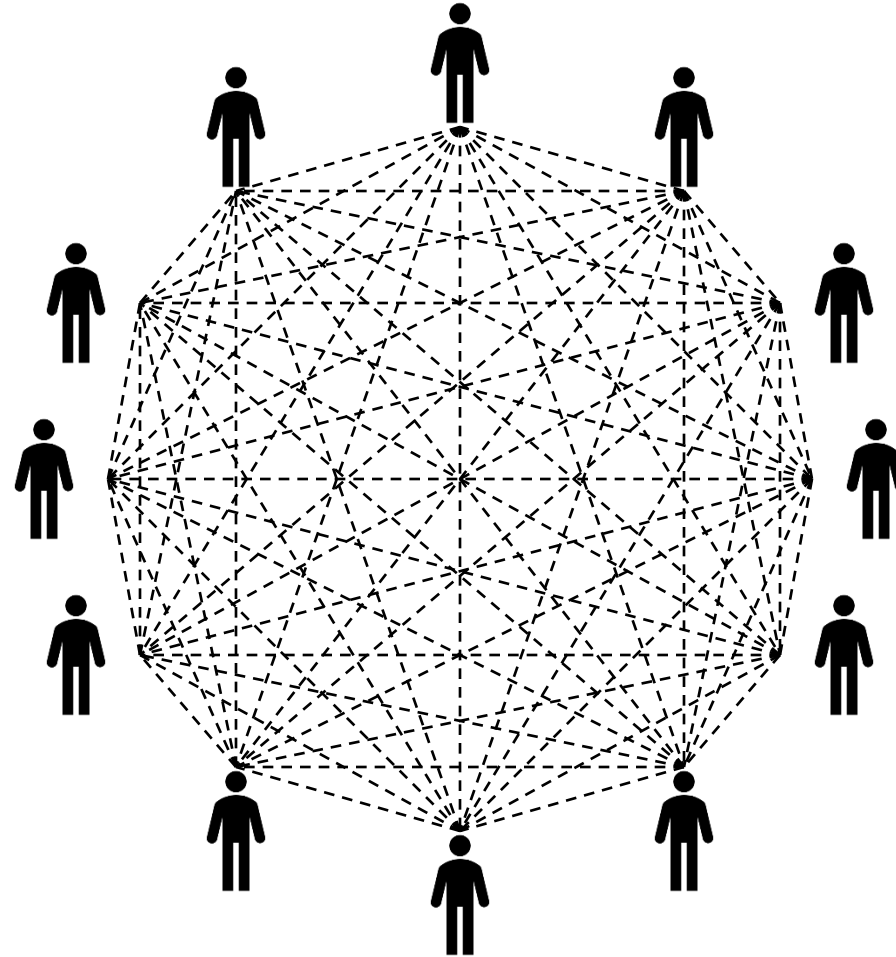
A Good Conversation Is a Trade between the
Conversationalists that Makes Them All Happy.

Round Table with 12 Guests





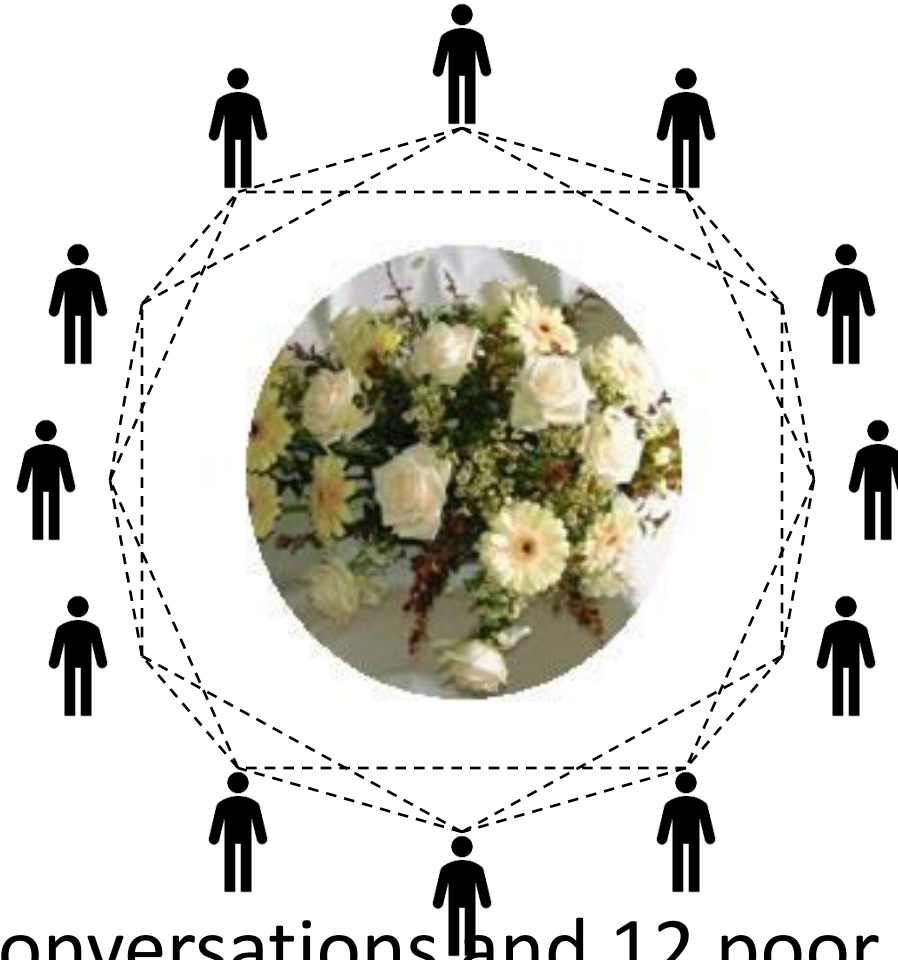
Round Table with 12 Guests



$66 = 12 \times (12 - 1) / 2$ potential conversations

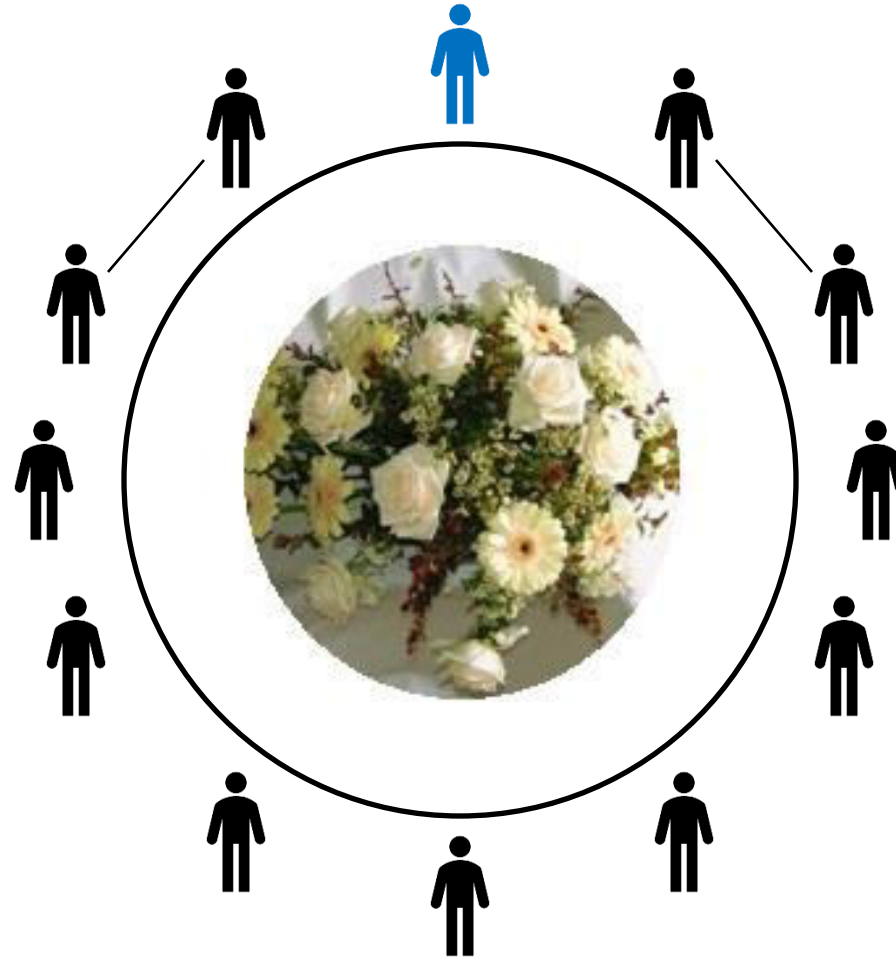


Round Table with Centerpiece



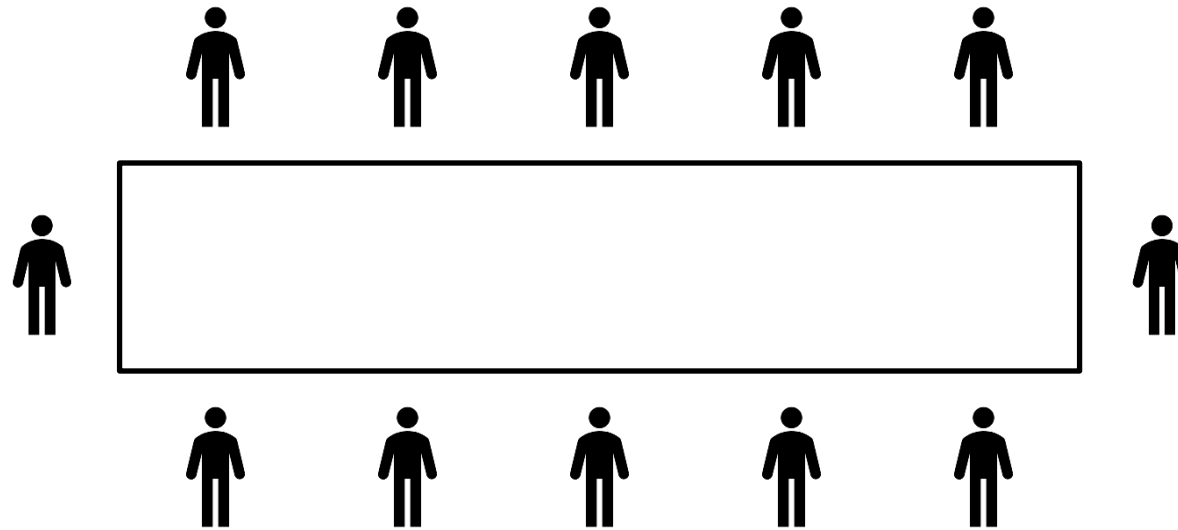
12 good potential conversations and 12 poor ones that very likely must be multilateral

The Blue Guy Is Not Having a Good Time



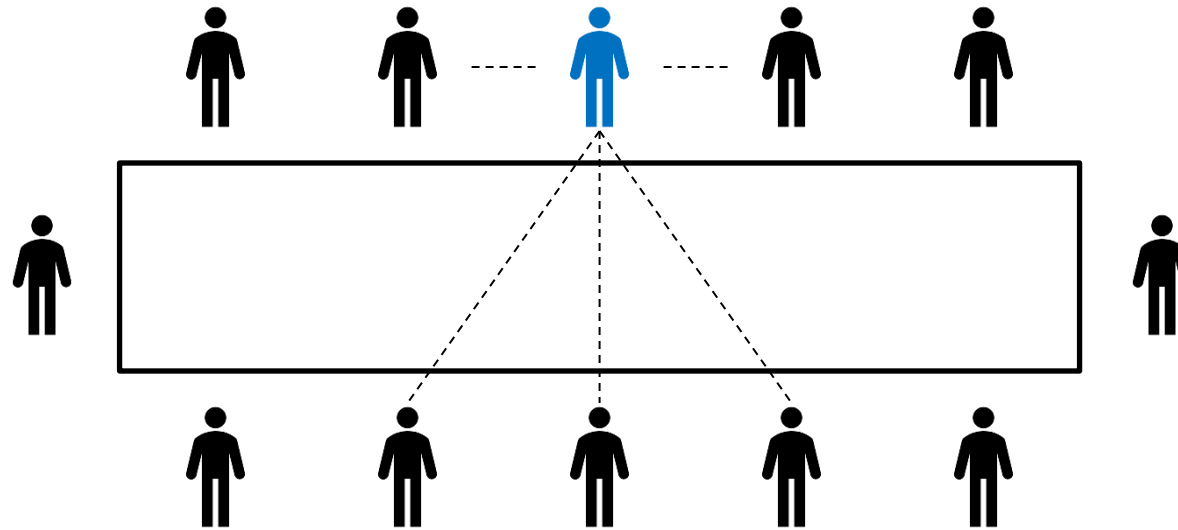
His neighbors are talking to each other.

Long Table with 12 Guests





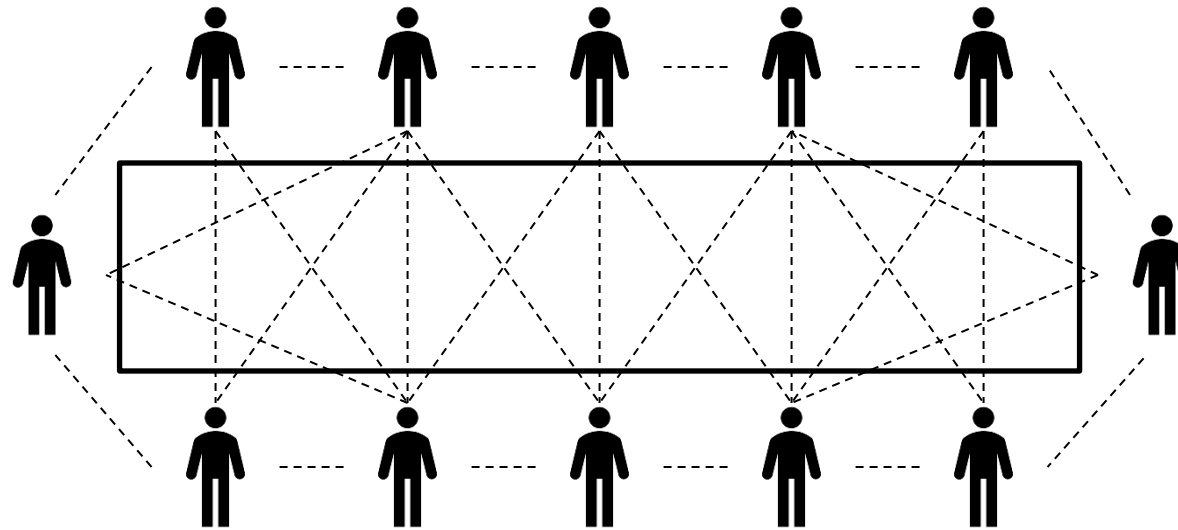
The Blue Guy at the Long Table



He has five good potential conversations, many of which could be multilateral.



Long Table with 12 Guests



29 total good potential conversations, more than twice greater than the round table number



The Settlement Problem



Trust Has Two Dimensions

To settle a trade, traders must be

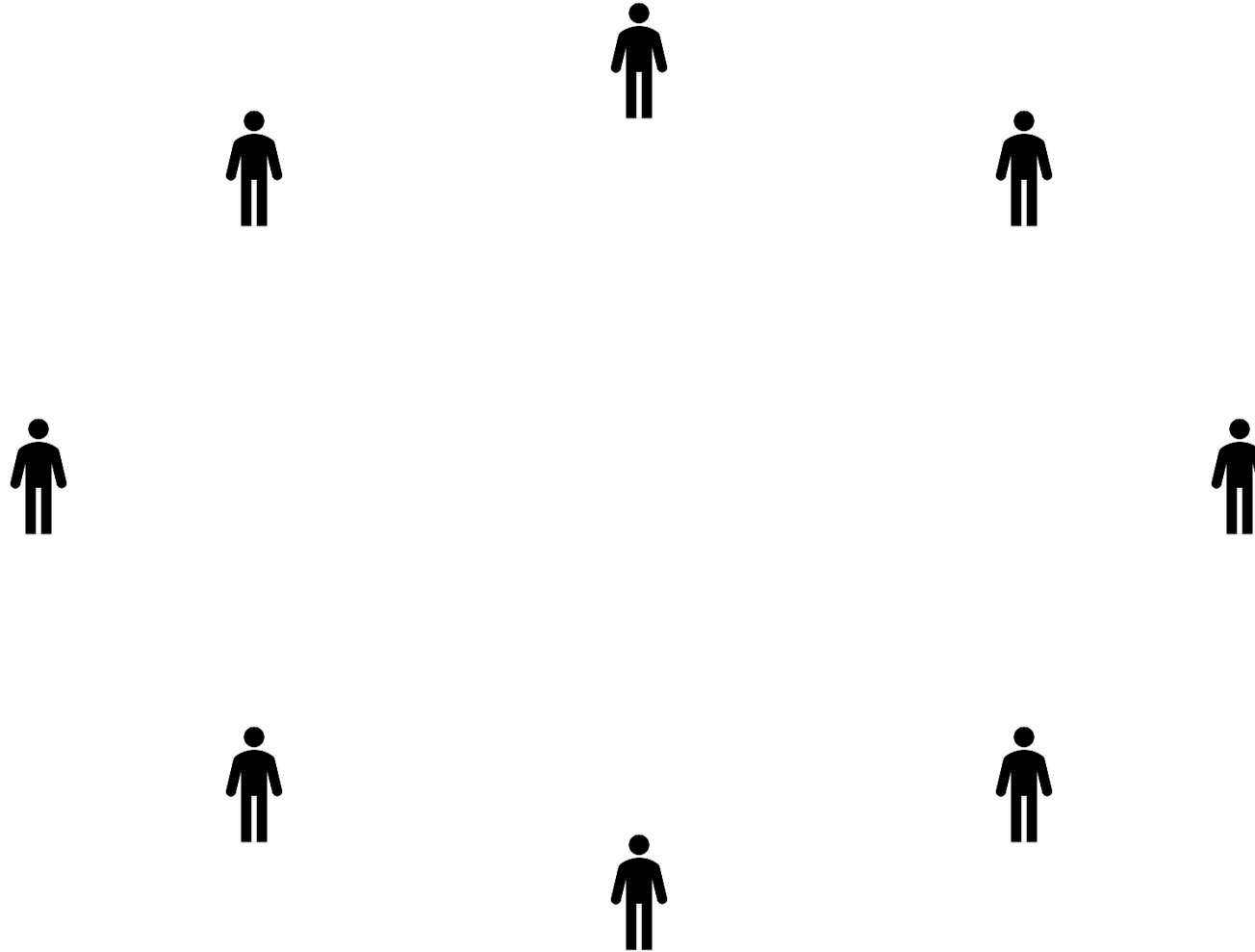
- Trustworthy—Willing to do what they agree to do.
- Creditworthy—Able to do what they agree to do.



Counterparty Risk

- Counterparty risk is the risk that your trade will not settle.
 - Your counterparty may not be trustworthy or creditworthy.
- Counterparty risk increases with the time until settlement and with volatility.
 - Changes in value may cause a trader to renege.
 - Changes in trader credit may prevent a trader from performing.

No Trade without Trust



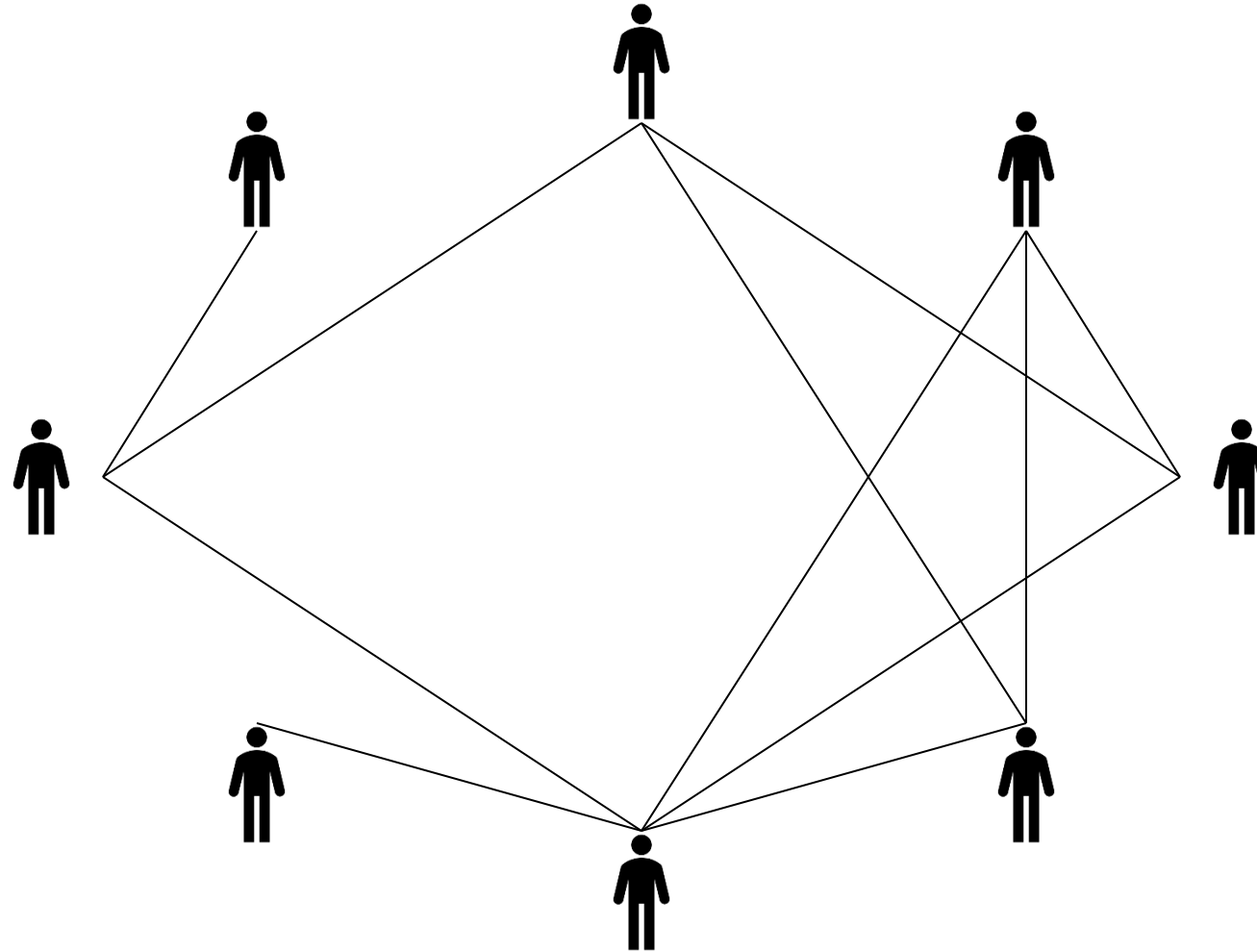
Strangers generally don't trust each other.



Most people are strangers to each other in large economies.

In small ones too!

Limited Credit Relationships Limit Potential Trades



Only 11 of 28 possible trades in this chart



Settlement Problem Solutions



Ways to Control Counterparty Risk

1. Check credit.
2. Rely on intermediaries.
3. Use security deposits and performance bonds.
4. Promise future business.
5. Sue in court for performance.
6. Use extrajudicial enforcement mechanisms.
7. Trade only with trusted family and friends.



1. Know Your Counterparty



Credit Checks

- Study the character and credit of your potential counterparties.
 - Credit checks can help you find reliable counterparties.
- But credit checks are expensive.
 - Especially if you must do many checks to find a suitable counterparty.
- Credit bureaus can lower the costs of checking credit.



Reputation

- Credit checks are less expensive for traders with well-known reputations.
 - Reputation thus is valuable to traders.
- Reputation may not be reliable if the counterparty is near bankruptcy, quitting the business, or retiring soon.



2. Intermediaries

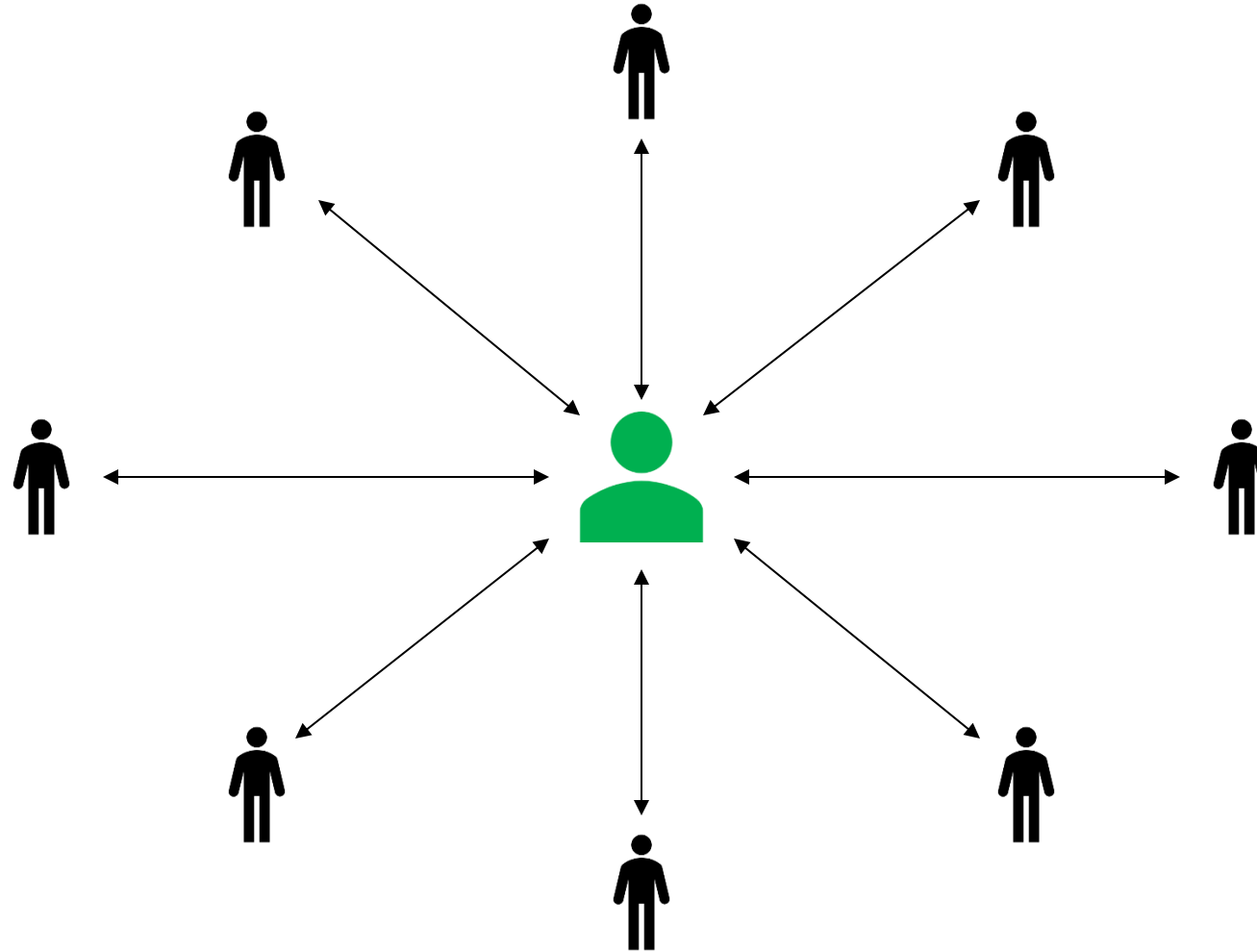


The Role of Intermediaries

- Intermediaries vouch for their clients by guaranteeing their trades.
 - Brokers
 - Clearinghouses
 - Banks or governments providing letters of credit
- Intermediation works when the traders trust the intermediary.
 - Intermediation vastly decreases the number of necessary credit checks.



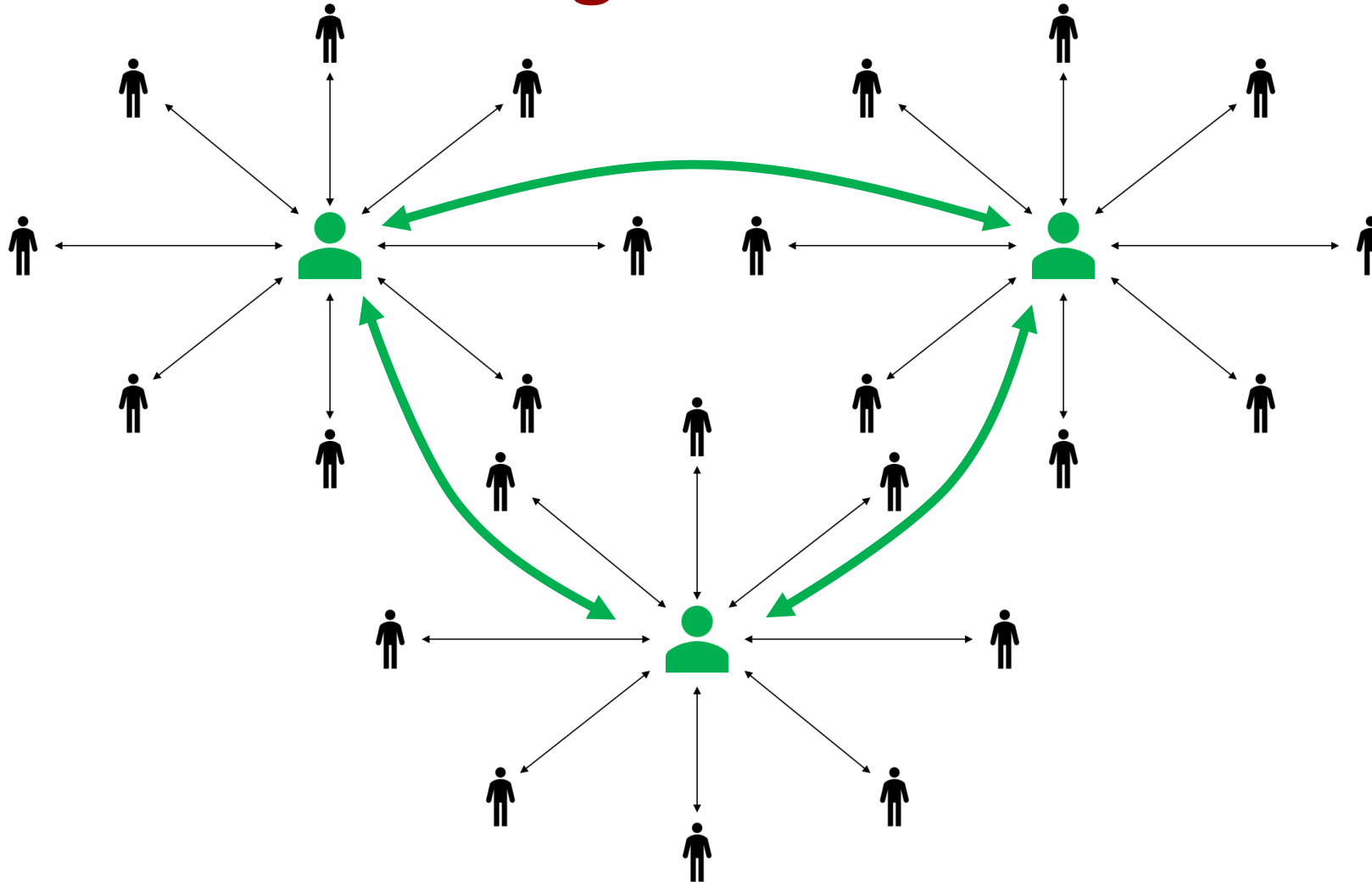
Intermediation by a Broker



Now only 8 relations instead of 28 potential ones.

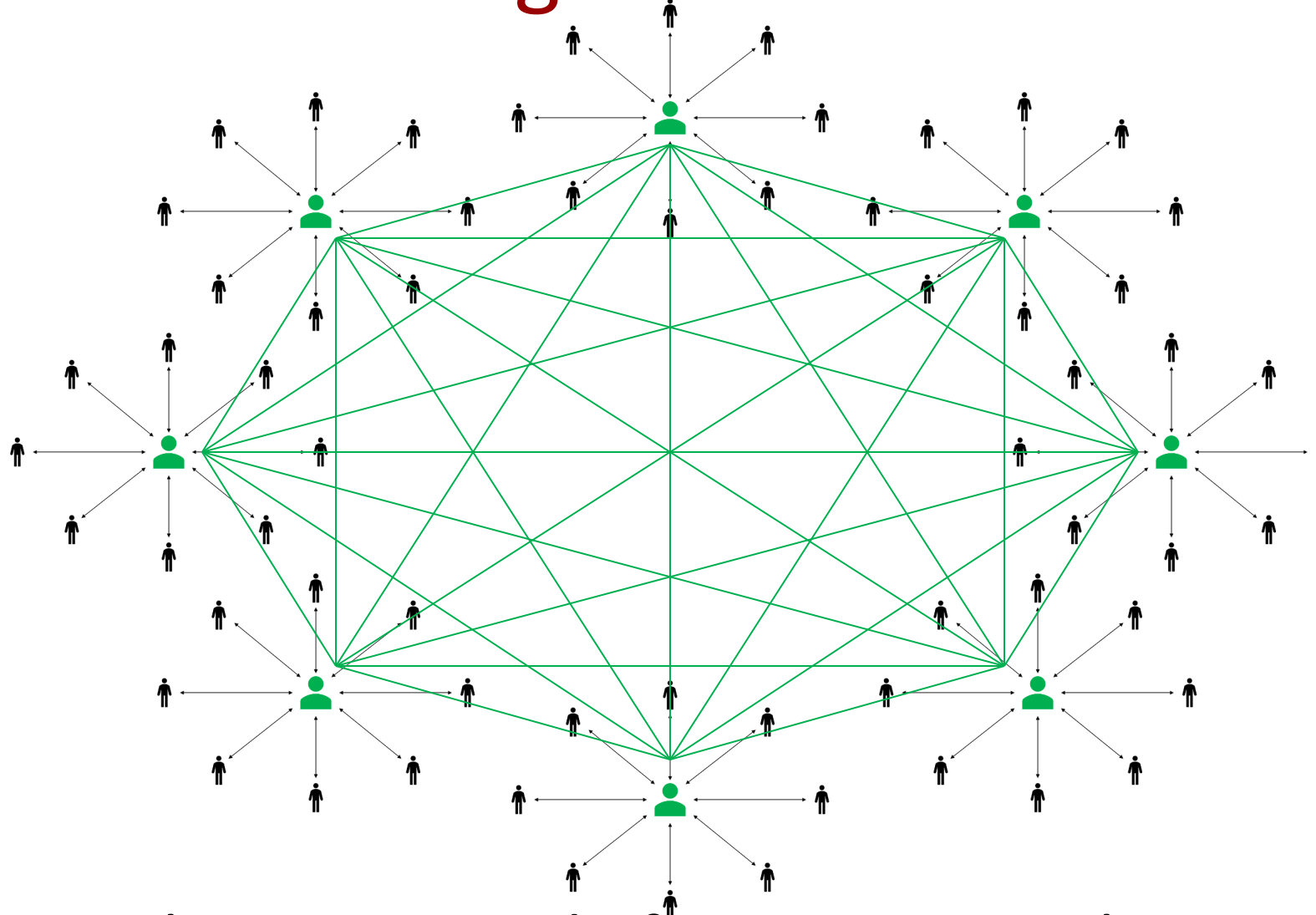


Three Brokers Serving 24 Traders



Now only 27 relations instead of 276 potential ones.

Eight Brokers Serving 64 Traders



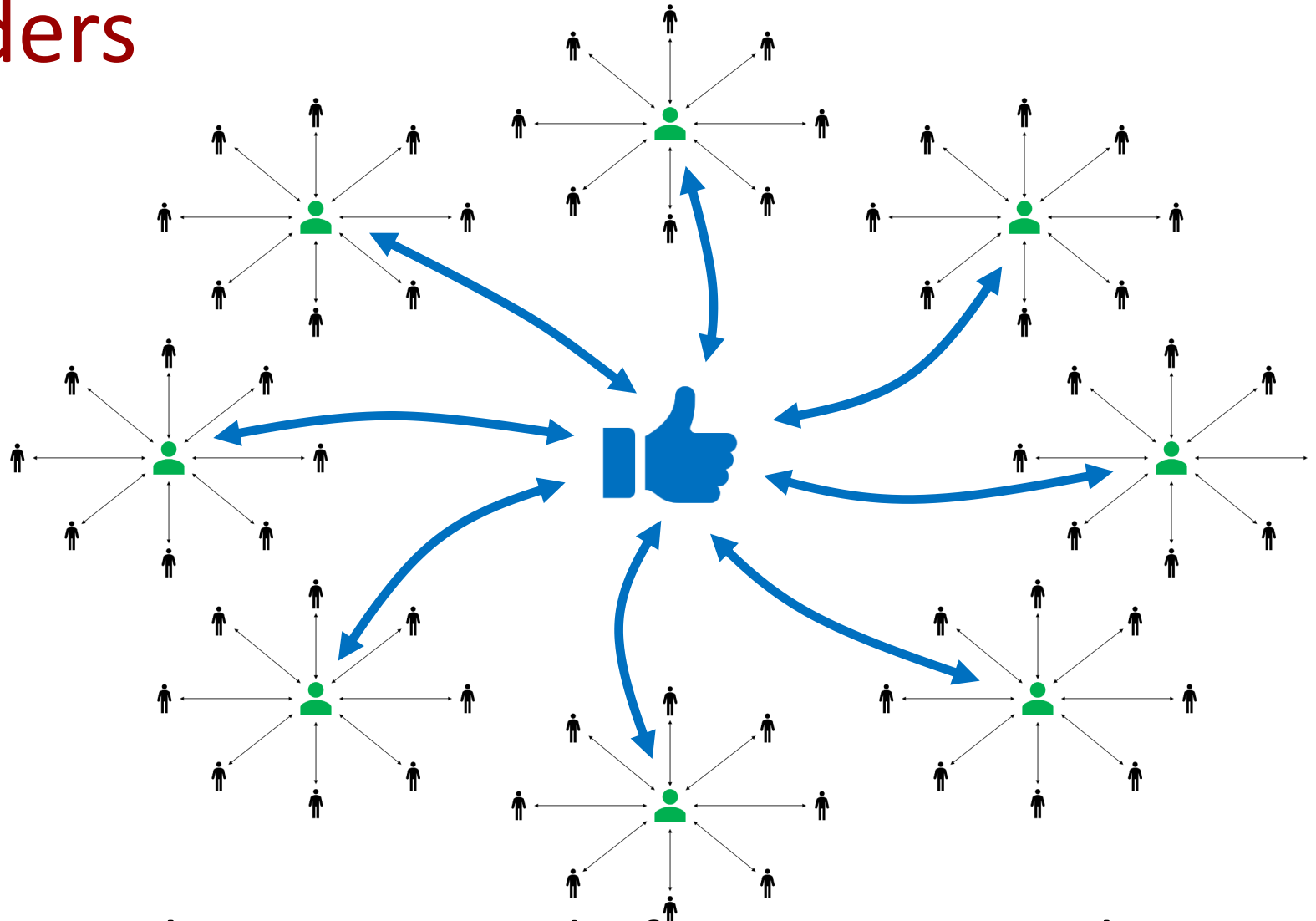
Now only 92 relations instead of 2,016 potential ones.

Clearinghouses



- Clearinghouses guarantee trades introduced to them by their clearing members.
- If a clearing member defaults, the other clearing members are responsible.
- Clearing members guarantee their clients' trades.
 - Introducing brokers
 - Brokerage clients
- Brokers guarantee their clients' trades.

A Clearinghouse, 8 Clearing Members, and 64 Traders



Now only 72 relations instead of 2,016 potential ones.



A More Realistic Calculation

- 1 clearinghouse
 - 20 clearing members
 - 100 introducing brokers
 - 50,000,000 clients
- ➔ Only 50 million credit relations support 1.25 quad-trillion (10^{15}) potential trade pairs.



A Second Clearinghouse Benefit

- For contracts guaranteed by a clearinghouse, traders can offset their positions by simply trading out of the contract.
- If a trader is both long and short a contract, the clearinghouse will net out the position.
- In contrast, parties to an OTC contract cannot easily exit their positions.
 - Your counterparty may not want to exit and may not accept the credit of your proposed substitute.



Benefits of Netting

- Netting allows people to use futures contracts to hedge local price risks cheaply.
- The hedge works well if the futures price and the local price are closely correlated.



Futures Hedging Example

- A risk-averse Nebraska farmer is growing corn that will drop in value if corn prices fall.
- To hedge the price risk, the farmer sells futures contracts obligating him to deliver corn in Chicago (1,000 km away) in November.
- In October, the farmer sells his harvested corn to a local grain dealer and buys back the November futures contracts, thereby offsetting his Chicago delivery obligation.



3. Security Deposits and Performance Bonds



Security Deposits (Margin)

- Intermediation guarantees often require the client to deposit cash or securities that the guarantor can use to cover losses.
- If losses on the contract deplete the deposit and the client does not replenish the deposit, the guarantor will close the position.
- The system works best in liquid markets that produce informative prices.



Security Deposit Problems

- Poor people often cannot post security deposits or performance bonds.
- Many contracts cannot be terminated by the guarantor to stop losses.
 - Contracts cannot easily be exited when they are unique or when no liquidity is available.



Performance Bonds

- Many contracts for services require performance bonds.
- Sometimes a third party holds the bond.
 - Perhaps a government interested in the timely completion of a construction job
- The holder of the bond can use its value to finish the job.



4. Future Business Expectations



Business Expectations

- Expectations of future business can enforce a contract.
- The potential defaulter must believe that the gain from defaulting is less than the value of lost future business.



Promises

- Credible promises of future business can strengthen expectations.
- Issues that increase credibility:
 - The promiser's potential future trades must be easily forecast.
 - The promiser must have a reputation for keeping promises.
 - The promiser would save costs by dealing with the same counterparty.



5. Judicial Solutions to Settlement Problems



Legal Solutions

- Prevailing in a lawsuit, or simply the threat of a lawsuit, can enforce a contract.
- But lawsuits are very expensive.
 - Arbitration can be cheaper.
- Winning does not help if the counterparty cannot or will not perform.



Legal Channels Works Best When

- Contracts are unambiguous about all important contingencies.
- Judgments are predictable.
 - The law must be complete and well defined so the bases for a decision are unambiguous.
 - Adjudicators must make fair (impartial) decisions.
- Judgments are quick and inexpensive.
- Judgment enforcement is cheap and effective.



A Final Comment About the Rule of Law

- Good enforcement mechanisms increase compliance and thus obviate the need for enforcement actions.
- A well-functioning legal system with predictable results thus should not be used much.



6. Extrajudicial Solutions to Settlement Problems



Strongmen and Ostracization

- Strongmen can enforce contracts through the threat of—and sometimes use of—violence.
 - Only enforces contracts for the stronger counterparty.
- The use of public ostracization may enforce some contracts.
 - Reports to credit rating agencies.
 - Internet-based ratings mechanisms.
 - Public and private messaging.



Problem with Extrajudicial Solutions

- Counterparties may unfairly apply violence and public ostracization.
- Both mechanisms may expose both parties to significant costs, and they may promote escalating extrajudicial responses.

Don't let my polite language minimize these dangers!



7. Trusted Family and Friends



Family and Friends

- Family and friends are known well so you can trade with only those you know are trustworthy and creditworthy.
- The threat of ostracization or banishment may enforce contracts.
- Trading with family and friends is the default solution to the settlement problem where markets and legal systems are weak.

Problems with Trading with Only Family and Friends



- The probability of finding a willing and capable counterparty is low because the number of trusted family and friends (N) is small.
- The probability of finding the best (most capable or cheapest) counterparty is likewise low.
- Business disagreements can break up families and friendships.



Ex Post Renegotiation

Some final comments about settlement problems



The Renegotiation Settlement Problem

- Ex post renegotiation occurs when one or both parties want to change the terms of the trade.
- A settlement problem occurs when one party tries to impose unilateral changes (holdups).
- The power to impose holdups depends on the costs of enforcing the contract.



The Private Costs of Holdups

- The potential for holdups increases trade settlement uncertainty and thus trade costs.
- Traders who expect holdups incorporate the expected costs into their original contracts.
- But those who underestimate the costs lose.



The Social Costs of Holdups

- Underbidding by holdup cost under-estimators can reduce economic efficiency by preventing the lowest cost suppliers from winning.
- The increased uncertainty associated with holdups also reduces trade.



Solutions to the Holdup Problem

- Holdup problems occur when the other solutions to settlement problems do not work well.
- Improving other settlement mechanisms thus will reduce economic costs associated with the holdup problem.



Conclusion



Trade among Strangers

- Trade facilitates growth.
- Trade works best when strangers can easily trade with strangers.
- Growth thus depends on systems that help traders find each other and settle their trades.



Arranging and Settling Trades

- Brokers, exchanges, marketplaces, bulletin boards, advertising, and conferences help traders find strangers willing to trade.
- Credit rating agencies and clearinghouses help control counterparty risk.
- Contract standardization and market centralization concentrate liquidity.
- Good rule of law facilitates low-cost trade settlement among strangers.



Implications for Greater Growth



The Foundation of Economic Growth

- Economic growth depends on the infrastructure of trading and settlement.
- Countries interested in increasing growth must improve all aspects of this infrastructure.
- Countries with many poor people must find ways of verifying or securing their credit.
- The rule of law is most important because other systems depend on it.



Who imagined that N^2 could be so interesting?



Q and A

