

Deposit Protection

July 2024

1. Summary



- In this presentation we analyze deposit insurance, a system implemented to protect bank depositors from losses in the event of a bank failure. Deposit insurance aims to prevent bank runs and maintain financial stability by giving depositors confidence that their insured deposits are safe.
- Deposit insurance is required because of fractional reserve banking and maturity mismatch between short-term deposits and long-term loans. In the presentation we explain the advantages and disadvantages of fractional reserve banking.
- To complement the mechanism of creation of deposits with fractional reserve banking, we present the determination of the money supply as the combination of decisions made by the public (depositors and borrowers), commercial banks and the central bank in terms of deposits, currency, required reserves and excess reserves.
- To provide a worldwide view of existing deposit insurance institutions, we analyze the information in the International Association of Deposit Insurers (IADI) Annual Survey, which describes the year of establishment of the deposit insurance agencies (DIAs), their types, their legal structure, their mandates, their members, the types of deposit products eligible for coverage, if membership in the deposit insurance scheme (DIS) is mandatory, the type of funding used in the DIS, the method for assessing or levying premiums on member banks/institutions, the role of deposit insurers in resolution decision-making, the tools or methods available for dealing with failing banks, the authority to act as administrator/conservator, the authority to act as receiver/liquidator, the government of the resolution framework, and the maximum coverage limit per depositor per institution.
- Finally, to review the role of financial intermediaries as providers of liquidity and insurance, we present a simple model where early liquidations of investment projects destroy value and prevent savers from reaping a return on their investment. We show that the market allocation could improve upon an autarky one, but that it is not necessarily efficient. We show that in an economy where agents individually face independent liquidity shocks, the market allocation could be improved by a deposit contract offered by a financial intermediary.

2. Bank Runs



Mary Poppins' Bank Run

It's A Wonderful Life's Bank Run

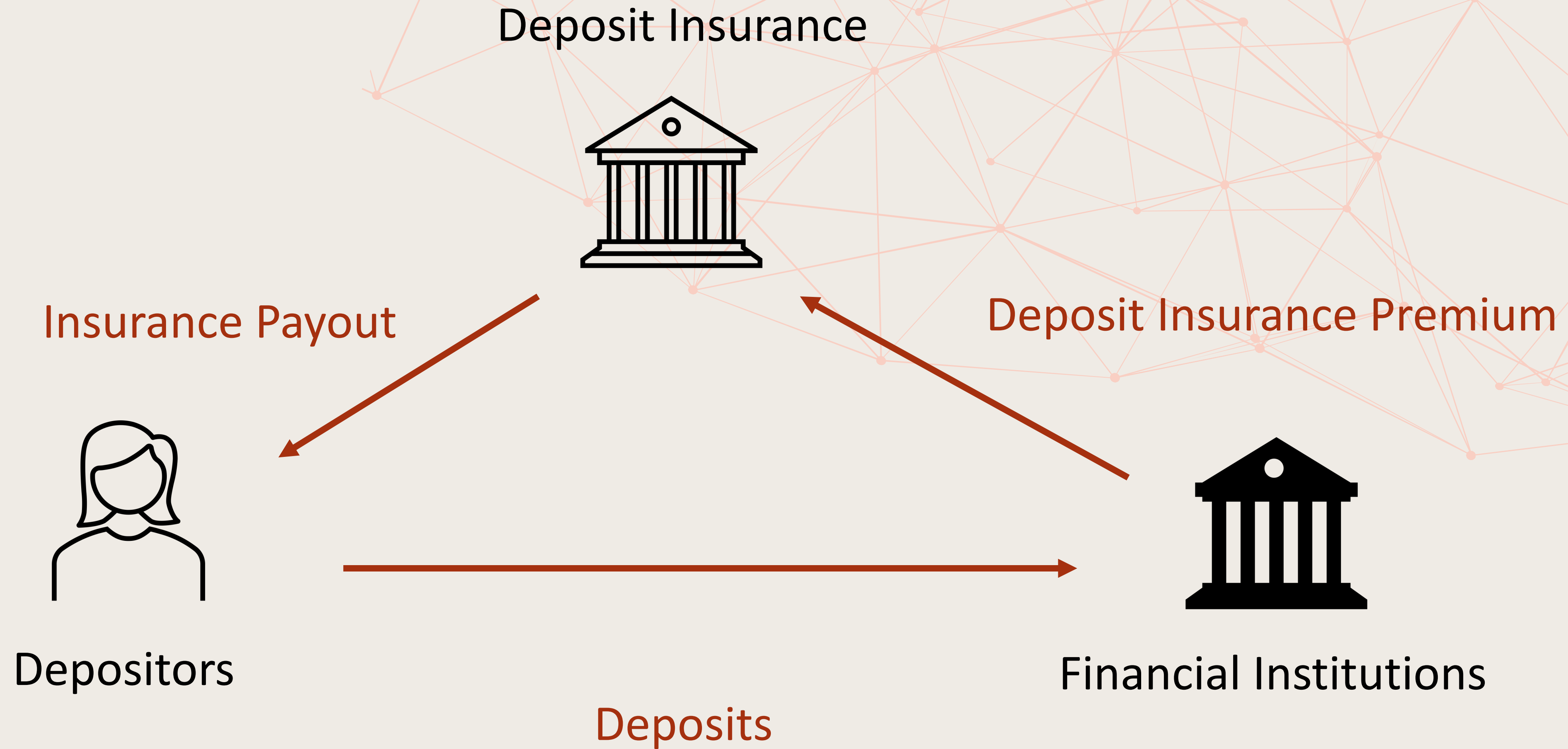


<https://youtu.be/xE5klz0yUT0>



<https://www.youtube.com/watch?v=OTJCI1FNBfA>

3. Deposit Insurance Mechanism





4. Fractional Reserve Banking

- Fractional reserve banking is a system where banks are required to hold only a fraction of the total deposits as reserves, while lending and investing the remaining deposits.
- The reserve requirement is the minimum percentage of deposits that banks must keep as reserves, set by the financial regulator or central bank.
- As an example, consider that a \$100.00 loan is granted from Bank A to a borrower, who then deposits this loan in her Bank B. Assume a 10% reserve requirement, then Bank B, receiving \$100.00 in deposits, requires keeping \$10.00 in reserves and can lent \$90.00 to the public.
- This process can be repeated several times, creating deposits and loans up to a maximum of $\frac{1}{\text{reserve requirement}}$ times the initial resources, in the following way:

Bank	Increase in Deposits (\$)	Increase in Loans (\$)	Increase in Reserves (\$)
A	0.00	100.00	0.00
B	100.00	90.00	10.00
C	90.00	81.00	9.00
D	81.00	72.90	8.10
E	72.90	65.61	7.29
F	65.61	59.05	6.56
G	59.05	53.14	5.91
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.			
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Total for all banks	1,000.00	1,000.00	100.00

4. Fractional Reserve Banking (cont.)

- Without fractional reserves, banks would serve as a safe box, which would require charging fees for the service of safeguarding unused deposits. Banks could still lend using shareholders capital or borrowing from other sources.
- The process that enables banks to generate loans, through fractional reserves, allows them to make additional potential profits and pay interest rates on deposits.
- Deposits, a bank's liability, are normally short-term, while loans, a bank's asset, could be medium-to long-term, creating a maturity mismatch.
- Even if loans are sound, and therefore could generate a return to banks making them solvent, maturity mismatch could generate liquidity problems if depositors decide to withdraw too many resources.
- If unexpected withdraws force banks to liquidate investments, and this early liquidation destroys value from projects, a liquidity problem could turn into a solvency problem.
- Central banks could play a role as lenders of last resort, lending to banks at a premium to alleviate liquidity problems.
 - Bagehot's dictum: **“[T]o avert panic, central banks should lend early and freely (i.e. without limit), to solvent firms, against good collateral, and at 'high rates’.”** Paul Tucker (2009) summarizing Walter Bagehot ([1873] 1897), *Lombard Street: A Description of the Money Market*, New York: Charles Scribner's Sons.



4. Fractional Reserve Banking (cont.)

Advantages

- Allows banks to earn profit by lending out a portion of deposits and earning interest on those loans.
- Provides more available credit for borrowers, potentially stimulating growth and development.
- Allows depositors to earn interest on their deposits.
- Central banks could control money supply by adjusting reserves.

Disadvantages

- Increases risk of bank failures and bank runs if too many depositors attempt to withdraw funds at once.
- Can contribute to inflation if banks create too much credit and money supply.
- Creates moral hazard where banks take excessive risks, on the assumption that they may be bailed out in a crisis.
- Transfers wealth from borrowers to lenders through interest payments.

5. Money Supply



Central Bank

Assets	Liabilities
Government Securities	Currency
Discount Loans to Commercial Banks	Reserves

Banks

Assets	Liabilities
Currency	Deposits
Government Securities	Discount Loans from Central Bank
Reserves	Loans from other Banks
Loans to Public	Capital
Loans to other Banks	Initial Capital and Non-Distributed Profits

Public

Assets	Liabilities
Currency	Loans
Deposits	

Money supply is given by:

$$\text{Money Supply} = \frac{1 + \frac{\text{Currency}}{\text{Deposits}}}{\frac{\text{Currency}}{\text{Deposits}} + \frac{\text{Reserve Requirement}}{\text{Deposits}} + \frac{\text{Excess Reserves}}{\text{Deposits}}} [\text{Currency} + \text{Reserves}]$$

6. International Association of Deposit Insurers (IADI) Annual Survey

- The **eldest institution** is the United States Federal Deposit Insurance Corporation established in 1933, followed by the German Institutional Protection Scheme of the National Association of German Cooperative Banks in 1934, and the Canadian Credit Union Deposit Guarantee Corporation (Saskatchewan) in 1953.
- **Type of deposit insurers** include government legislated and administered (53), central bank administered (19), government legislated and privately administered (24), and privately established and administered (9).
- **Deposit insurers agency legal structure** include as an independent agency (80), within the finance ministry (2), within the central bank (12), within the bank supervisor (5) and established by an association of banks (7).
- **Deposit insurers' mandates** include pay-box (25), pay-box plus (46), loss minimizer (17), risk minimizer (13), and other (5).
- **Members of deposit insurers** include commercial banks (94), credit unions (39), financial cooperatives (37), insurance companies (32), investment banks (33), Islamic banks (36), micro finance institutions (40), rural banks / community banks (31), savings banks (39), securities companies (30) and other deposit-taking institutions (53).



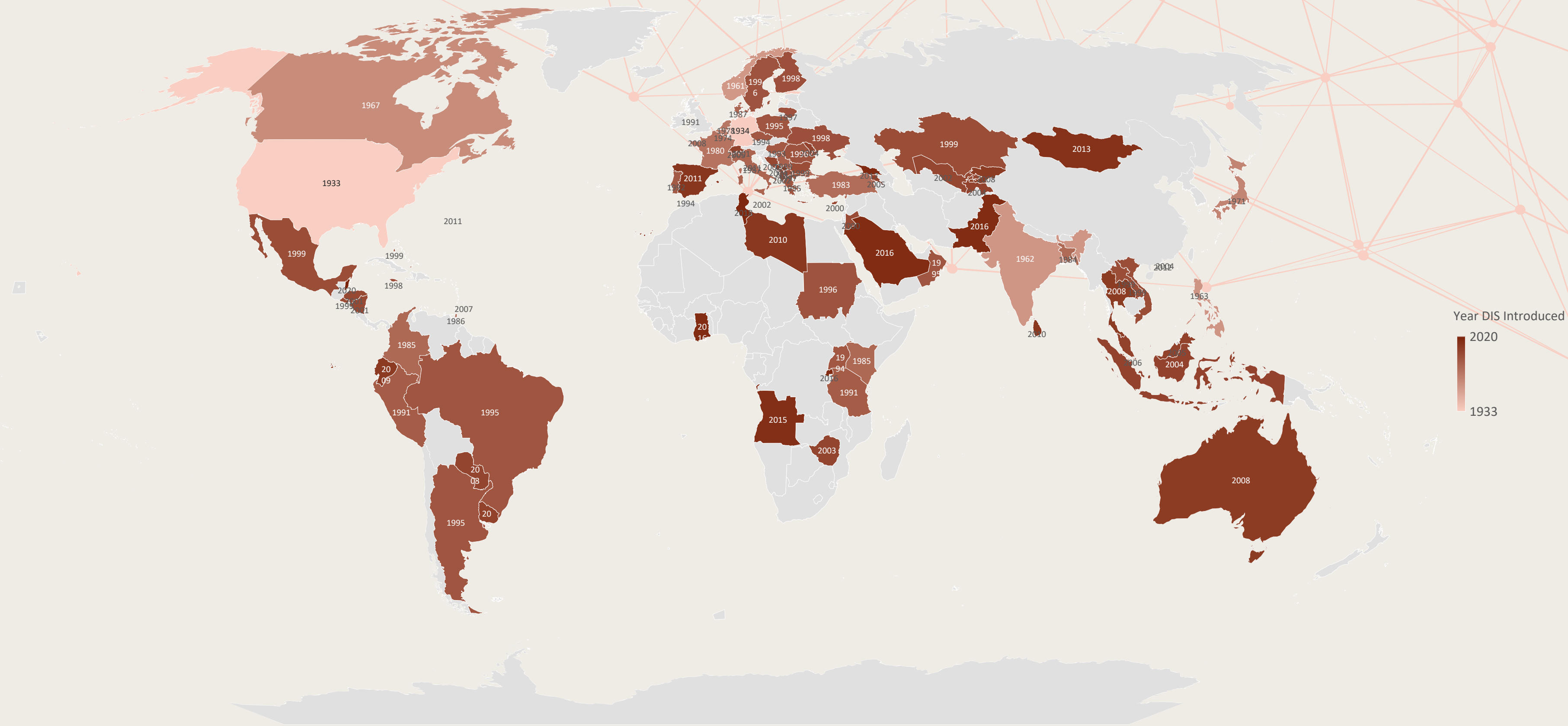
6. IADI Annual Survey (cont.)

- **Types of deposit products eligible for coverage by deposit insurers agency** include savings account (104), checking account (92), annuity contracts (7), certificates of deposit (61), guaranteed investment certificate (8), travelers checks (11), money orders (14), certified drafts of checks (18), foreign currency deposits (79), inter-bank deposits (9), government deposits (20).
- **Mandatory membership in the DIS for banks/institutions:** Yes 102, No 3.
- **Type of funding used by DIS:** ex-ante 102 , ex-post 20.
- **Method for assessing or levying premiums on member banks/institutions:** flat rate 62, differential rate 51.
- **Role of deposit insurers in resolution decision-making:** sole decision 11%, contribute to a decision 34%, no input but obliged to participate in resolution funding 37%, no input or responsibility 18%.
- **Tools or methods are available for dealing with failing banks in your jurisdiction:** purchase and assumption 83, bridge bank 71, liquidation 91, deposit reimbursement 91, bail-in 43.
- **The DIA have the authority to act as administrator/conservator?** Yes 26, No 77.
- **The DIA have the authority to act as receiver/liquidator?** Yes 33, No 71.
- **Resolution framework governed by:** Bankruptcy / insolvency law 42, Special resolution regime 73.

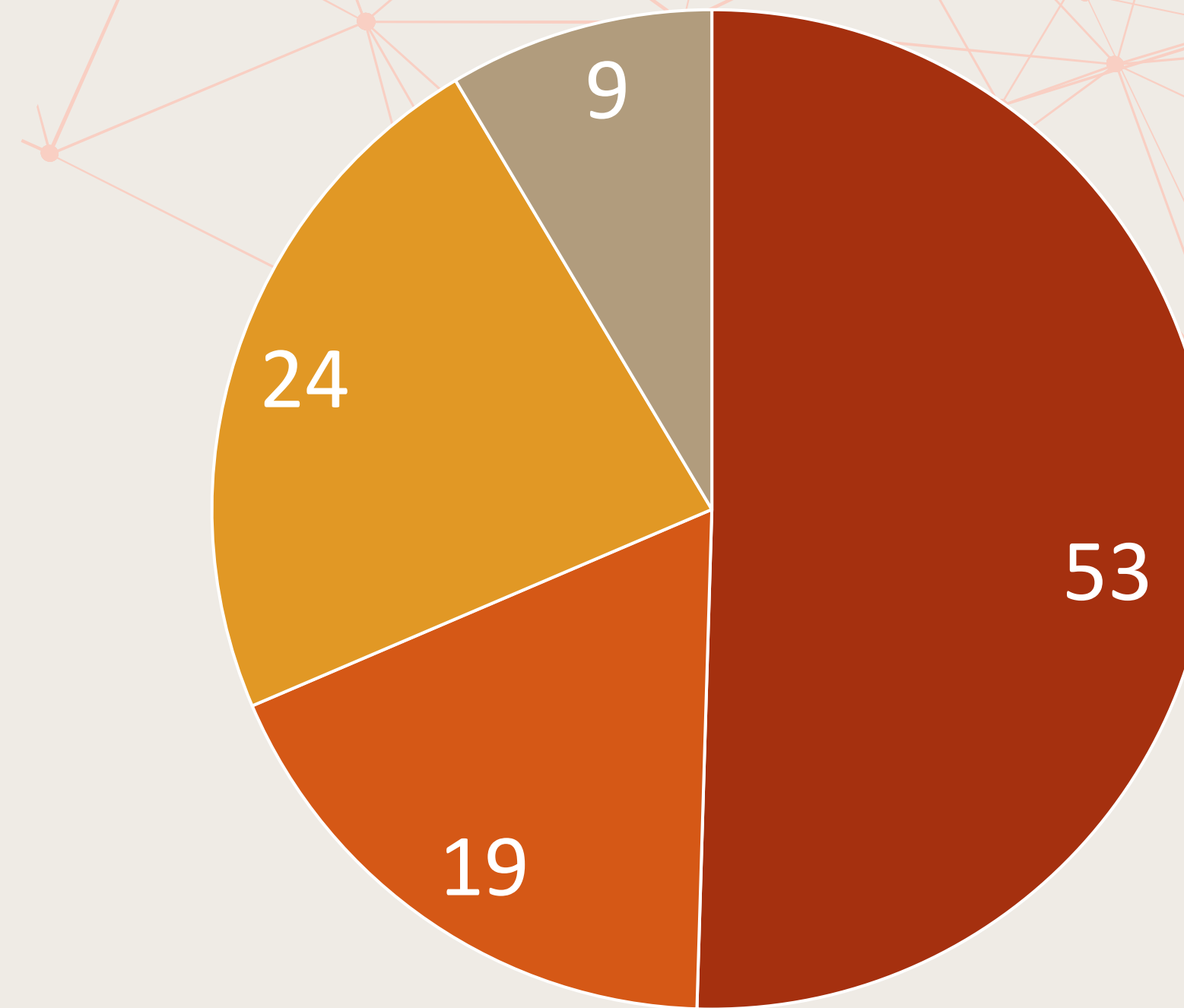


6. Year Deposit Insurance was Introduced

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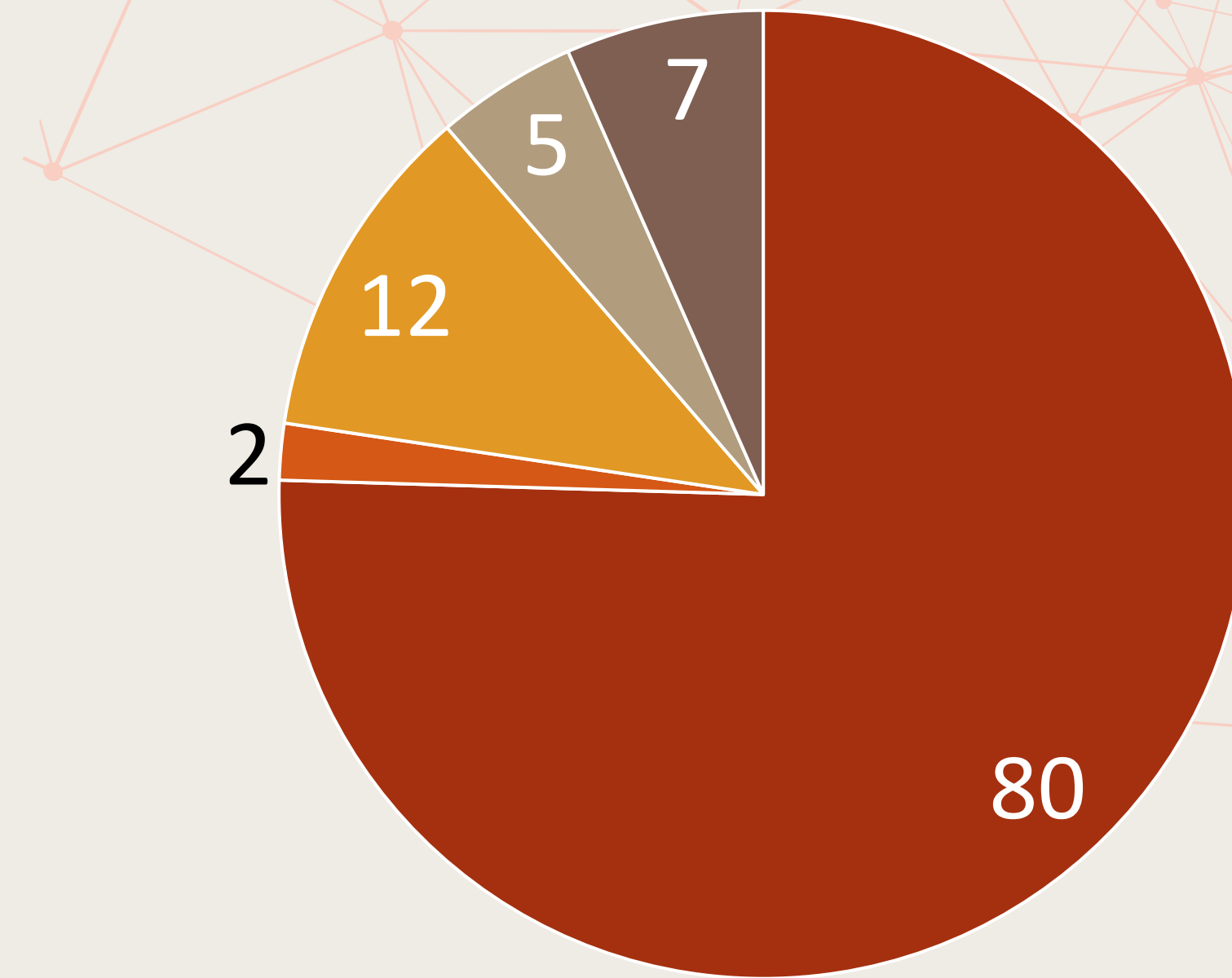
6. Type of Deposit Insurers



- Government legislated and administered
- Central bank administered
- Government legislated and privately administered
- Privately established and administered

Source: 2022 IADI Annual Survey

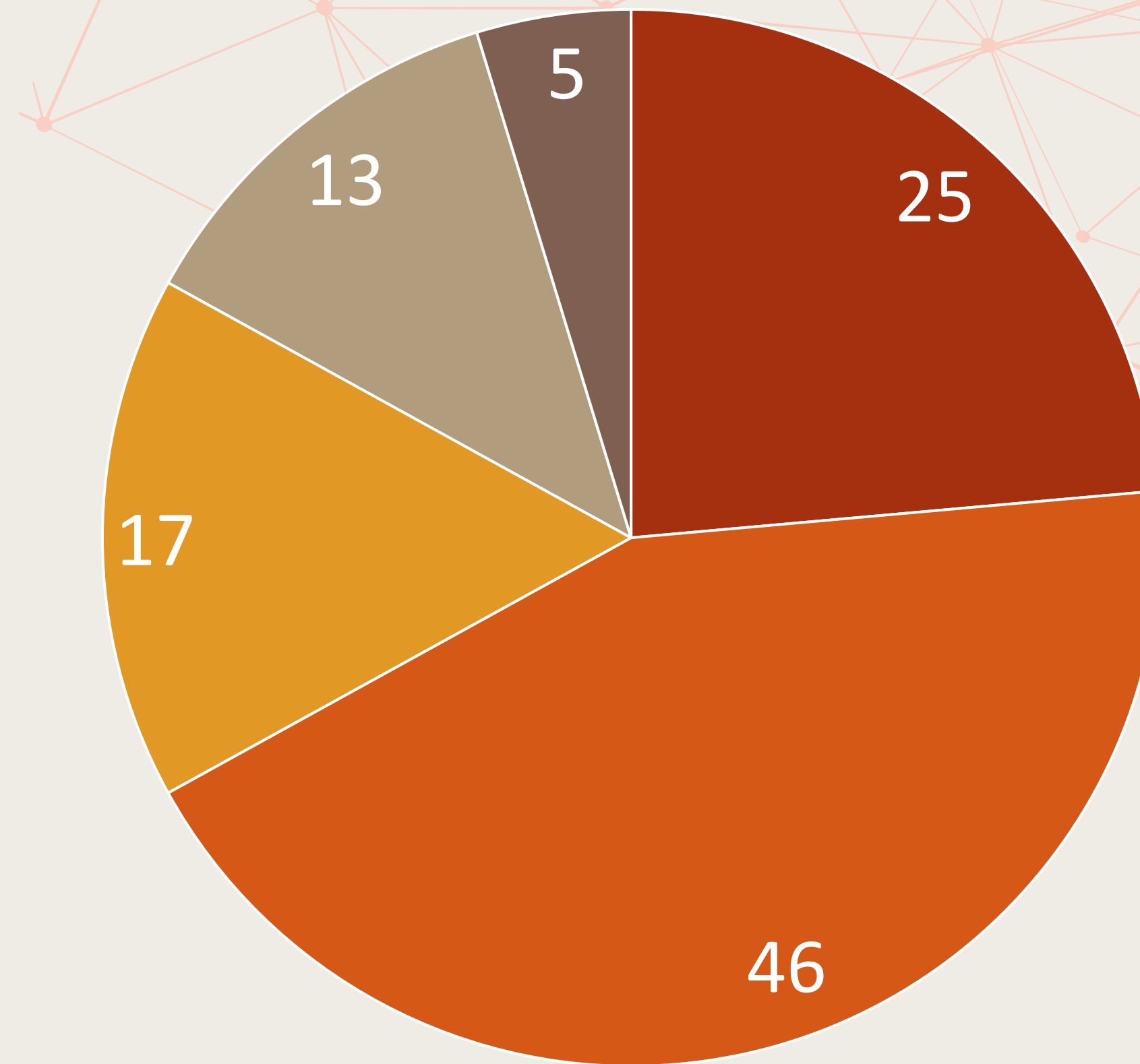
6. Deposit Insurers Agency Legal Structure



- As an independent agency
- Within the Ministry of Finance
- Within the Central Bank
- Within the Bank Supervisor
- Established by an Association of Banks

Source: 2022 IADI Annual Survey

6. Deposit Insurers' Mandates

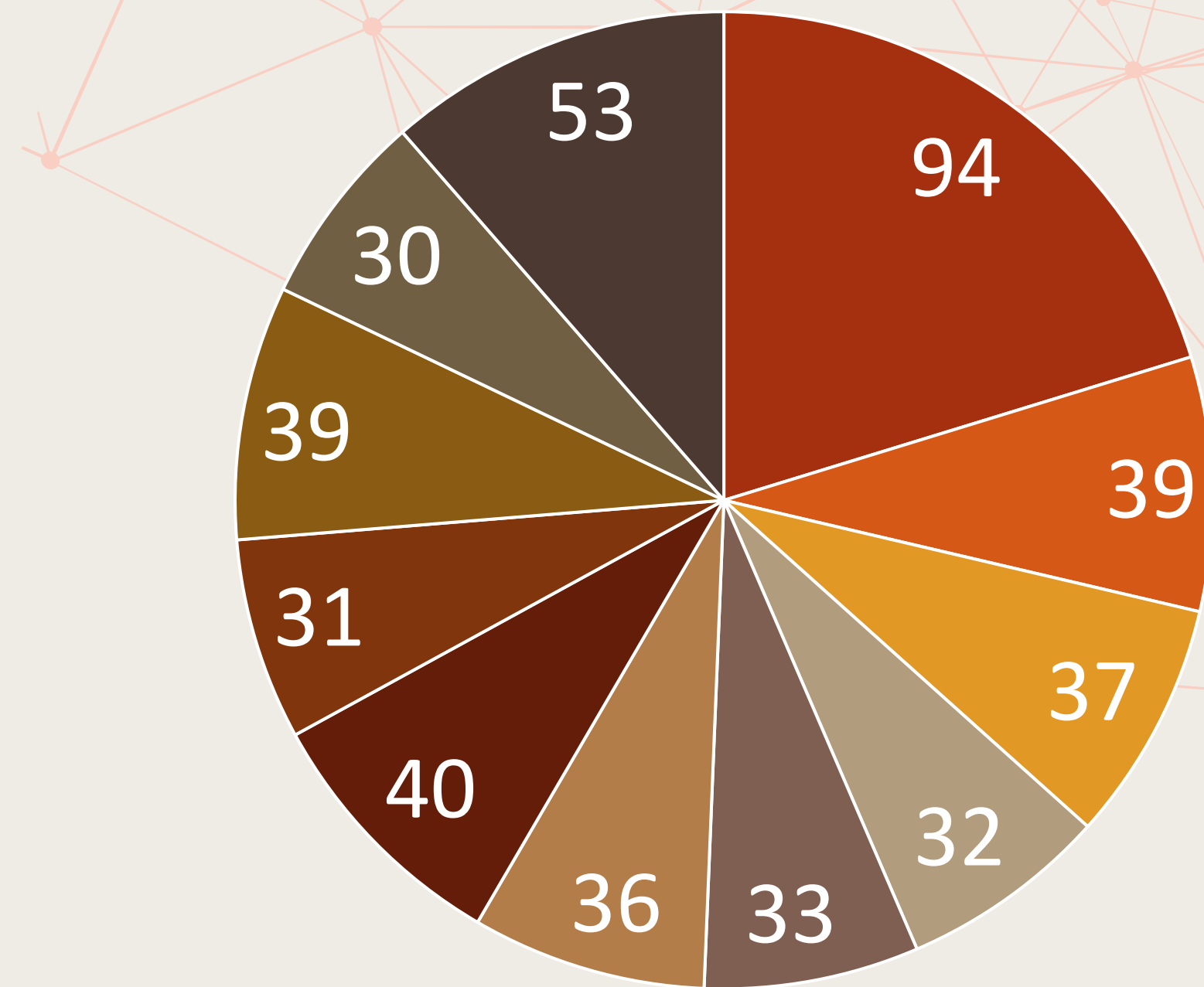


Paybox plus: the deposit insurer has additional responsibilities in resolution beyond reimbursement such as contributing to financing, operationalizing, and/or decision-making in resolution.

- Pay-box
- Pay-box plus
- Loss Minimiser
- Risk Minimiser
- Other

Source: 2022 IADI Annual Survey

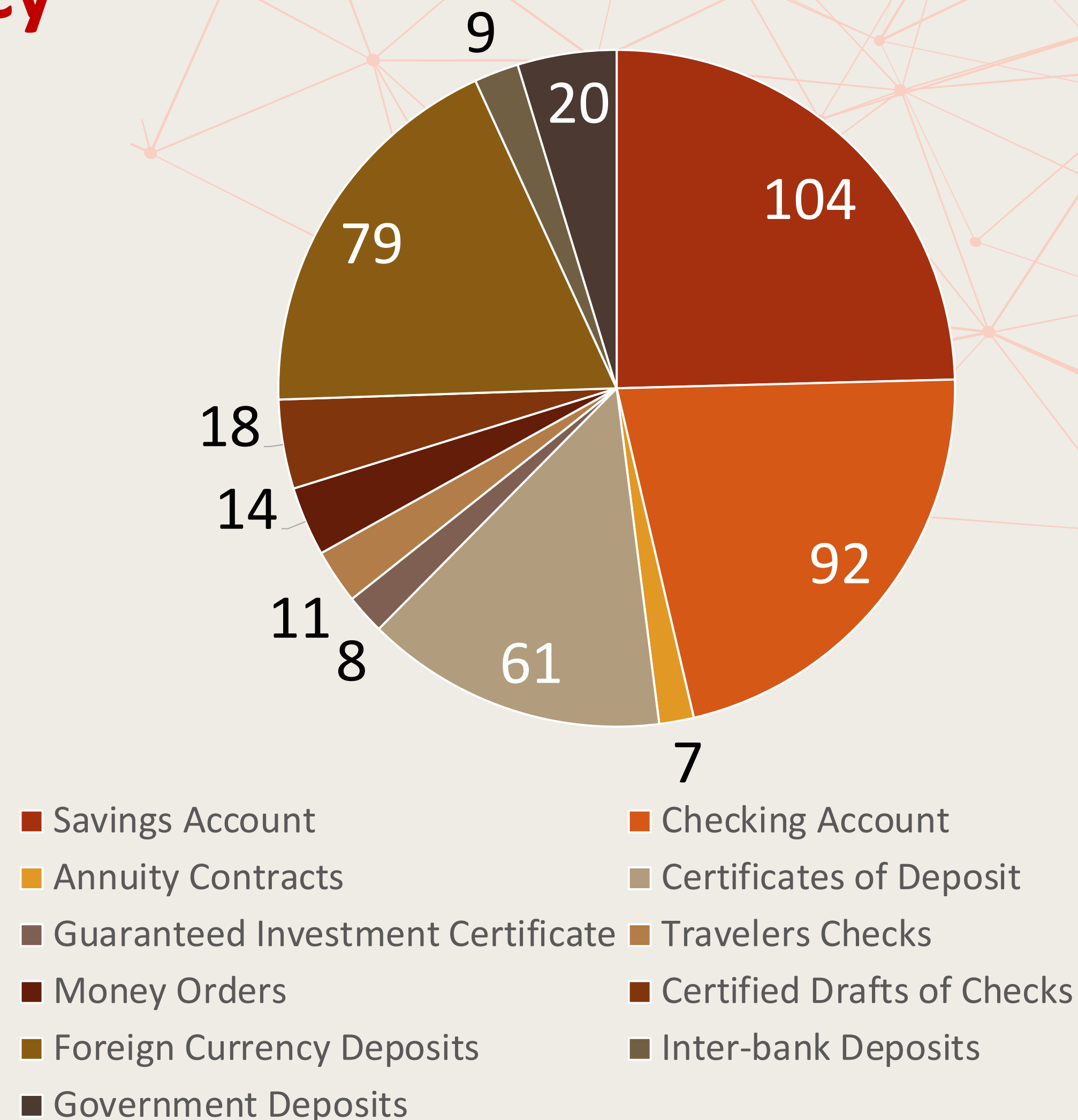
6. Type of Deposit Insurers Agency Member Banks / Institutions



- Commercial Banks
- Credit Unions
- Financial Cooperatives
- Insurance Companies
- Investment Banks
- Islamic Banks
- Micro Finance Institutions
- Rural Banks/Community Banks
- Savings Banks
- Securities Companies
- Other Deposit-taking Institutions

Source: 2022 IADI Annual Survey

6. Type of Deposit Products Eligible for Coverage by Deposit Insurers Agency

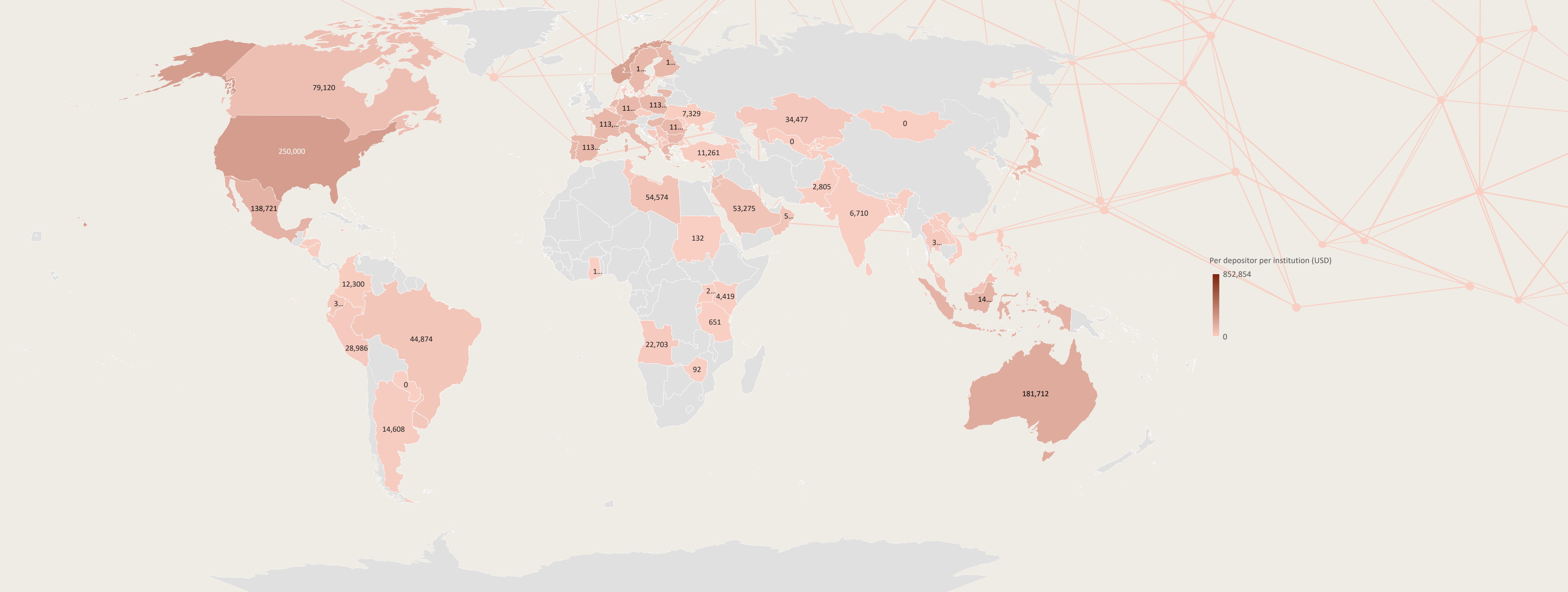


Source: 2022 IADI Annual Survey

6. Maximum Coverage Limit Per Depositor Per Institution in USD



Coverage ranges from the equivalent of USD 852,854 in Germany to USD 92 in Zimbabwe. Coverage in the United States is USD 250,000, in Norway it is USD 226,819, in Australia USD 181,712, in Indonesia USD 140,435, in Mexico USD 138,721 and in Gibraltar USD 135,318.



7. Liquidity and Insurance

- The role of financial intermediaries as providers of liquidity and insurance is exemplified in this model which follows Bryant, J., A Model of Reserves, Bank Runs and Deposit Insurance, Journal of Banking and Finance, 1980, Vol. 43, pp. 335 - 344.
- Consider an economy with one good and three periods, where a continuum of ex-ante identical agents have a one-unit endowment in period $t = 0$, of a good that will be consumed in periods $t = 1$ and $t = 2$.
- The easiest way to model “liquidity shocks” is to assume that in period $t = 1$ consumers discover if they will die young and will need to consume immediately (in period $t = 1$) in which case utility will be given by $u(C_1)$ or if they will die old (in $t = 2$) in which case the utility will be given by $\rho u(C_2)$ (where $\rho < 1$ is a discount factor). Assume that $u(\cdot)$ is increasing and concave. Ex-ante, the expected utility of the depositor is:

$$U = \pi_1 u(C_1^1) + \pi_2 \rho u(C_2^2) \quad (1)$$

where π_1 (respectively π_2) is the probability of being “type 1” (resp. type 2) that implies having to consume when young (resp. old), and C_t^i denotes the consumption of a type i agent at time t .

7. Liquidity and Insurance (cont.)

- The good can be stored from one period to the other or could be invested in a long-term technology with a return of $R > 1$ units in $t = 2$, but only $L < 1$ units if it needs to be liquidated in $t = 1$.
- The next discussion compares different institutional arrangements to show how a deposit institution could improve the economy's efficiency.
- **Autarky**: The simplest case is an economy without exchange among agents. Each agent decides independently the quantity I that she will invest in the illiquid technology.
- If she needs to consume in period $t = 1$, the investment will be liquidated yielding:

$$C_1 = 1 - I + LI = 1 - I(1 - L) \leq 1 \quad (2)$$

with equality only if $I = 0$.

- If she makes it to old age and consumes in $t = 2$, she will have:

$$C_2 = 1 - I + RI = 1 - I(R - 1) \leq R \quad (3)$$

with equality only if $I = 1$.

- In autarky, each consumer chooses the consumption profile that maximizes her ex-ante utility U (given by equation 1) subject to restrictions (2) and (3).

7. Liquidity and Insurance (cont.)

- **Market:** If agents are allowed to exchange, welfare could improve.
- For example, allowing in $t = 1$ that agents could exchange the good for a debt instrument (bond) that gives the right on the good in period $t = 2$. Denote with p the $t = 1$ bond's price that will pay one unit of the good at $t = 2$. Note that for exchange to take place we need $p \leq 1$, otherwise agents would prefer to store the good.
- By investing I in $t = 0$, an agent that needs to consume when young and sells RI bonds, she can get:

$$C_1 = 1 - I + pRI \quad (4)$$

- Meanwhile an agent that consumes when old and buys $\frac{1-I}{p}$ bonds, will get:

$$C_2 = \frac{1-I}{p} + RI = \frac{1}{p} [1 - I + pRI] \quad (5)$$

- The equilibrium price is $p = \frac{1}{R}$, because if it is higher, I would tend to infinity, while if it is lower, no-one would invest.
- Under exchange we would have the allocations $C_1^M = 1$, $C_2^M = R$ and $I^M = \pi_2$, which dominates, in the Pareto-sense, the allocations under autarky, given that it avoids liquidating investments.
- However, as we will see, the market allocation is not ex-ante Pareto optimum.

7. Liquidity and Insurance (cont.)

- **Optimal allocations:** from an ex-ante viewpoint, there is a unique allocation in the Pareto sense (C_1^*, C_2^*) which results from solving

$$\max \pi_1 u(C_1) + \pi_2 \rho u(C_2) \quad (6)$$

$$\text{subject to: } \pi_1 C_1 + \pi_2 \frac{C_2}{R} = 1 \quad (7)$$

- The optimal allocation satisfies the optimality condition:

$$u'(C_1^*) = \rho R u'(C_2^*) \quad (8)$$

- Except for the peculiar case in which:

$$u'(1) = \rho R u'(R)$$

the market allocation $(C_1^M = 1, C_2^M = R)$ is not optimal in the Pareto sense.

- In particular, if the relative risk aversion index is larger than one $\frac{-Cu''(C)}{u'(C)} > 1$, given that $R > 1$,

$$\rho R u'(R) < \rho u'(1) < u'(1) \quad (9)$$

and the market allocation could be improved in the Pareto sense if C_1^M is increased and C_2^M is reduced:

$$C_1^M = 1 < C_1^* ; C_2^M = R > C_2^* \quad (10)$$

- In other words, market exchange does not provide a perfect insurance against liquidity shocks and therefore it does not allow for an efficient allocation of resources.
- Now we will see how a financial intermediary could resolve this problem.

7. Liquidity and Insurance (cont.)

- **Financial Intermediary**: The Pareto optimal allocation (C_1^*, C_2^*) could be implemented by a financial intermediary that offers a deposit contract where in exchange of one unit at $t = 0$, the agent receives C_1^* in $t = 1$ or C_2^* in $t = 2$.
- To fulfill its obligations, the financial intermediary stores $\pi_1 C_1^*$ and invest the rest in the illiquid technology.
- **Result**: in an economy where agents individually face independent liquidity shocks, the market allocation could be improved by a deposit contract offered by a financial intermediary.
- The reason why the market allocation is not Pareto optimal is because there are no state-contingent complete markets: it means the state of the economy (the whole list of consumers that need to consume when young) is not observable by someone. The only available non-contingent financial market (the bond market) is not sufficient to efficiently distribute the risk.