



OPZIONI REALI

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Società che hanno utilizzato le Opzioni Reali

- Enron: opzioni di conversione di generatori
- Parmalat: nuovi prodotti in Brasile
- HP: Produzione e distribuzione
- Worldcom:
- Apple: decisioni per l'uscita per il business del pc
- Italease: asset finanziari
- Citygroup: derivati
- Alitalia: Malpensa
- Exxon: prospezione ed estrazione di petrolio

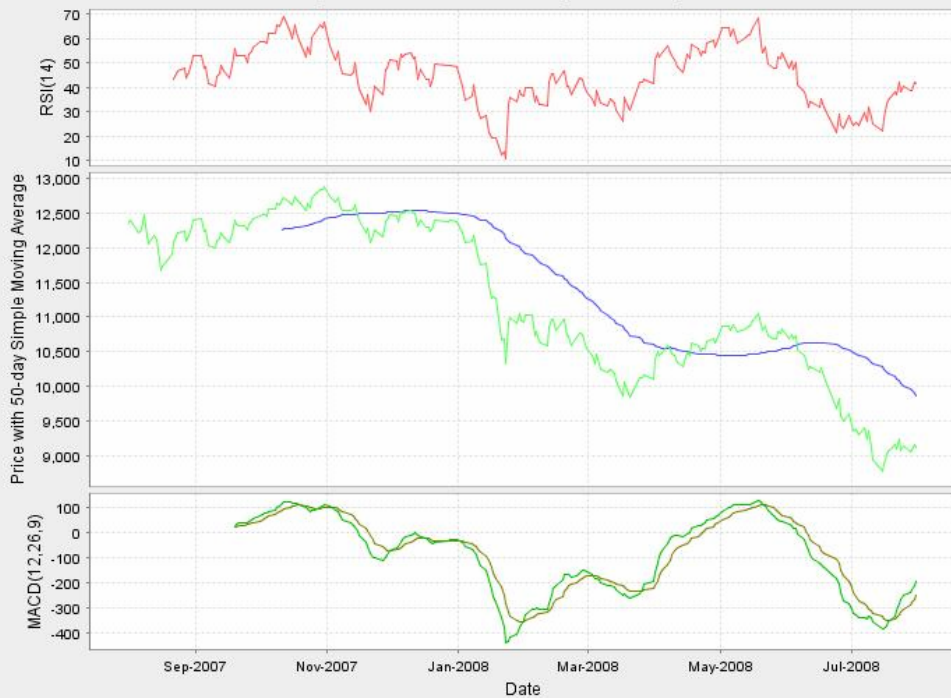
Società che hanno utilizzato le Opzioni Reali

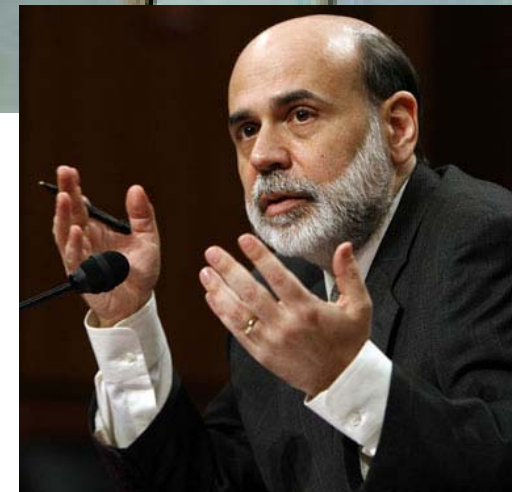
- Airbus industries
- ICI
- Texaco
- Pratt and Whitney
- Mobil
- Anadarko Petroleum
- Cadence Design System



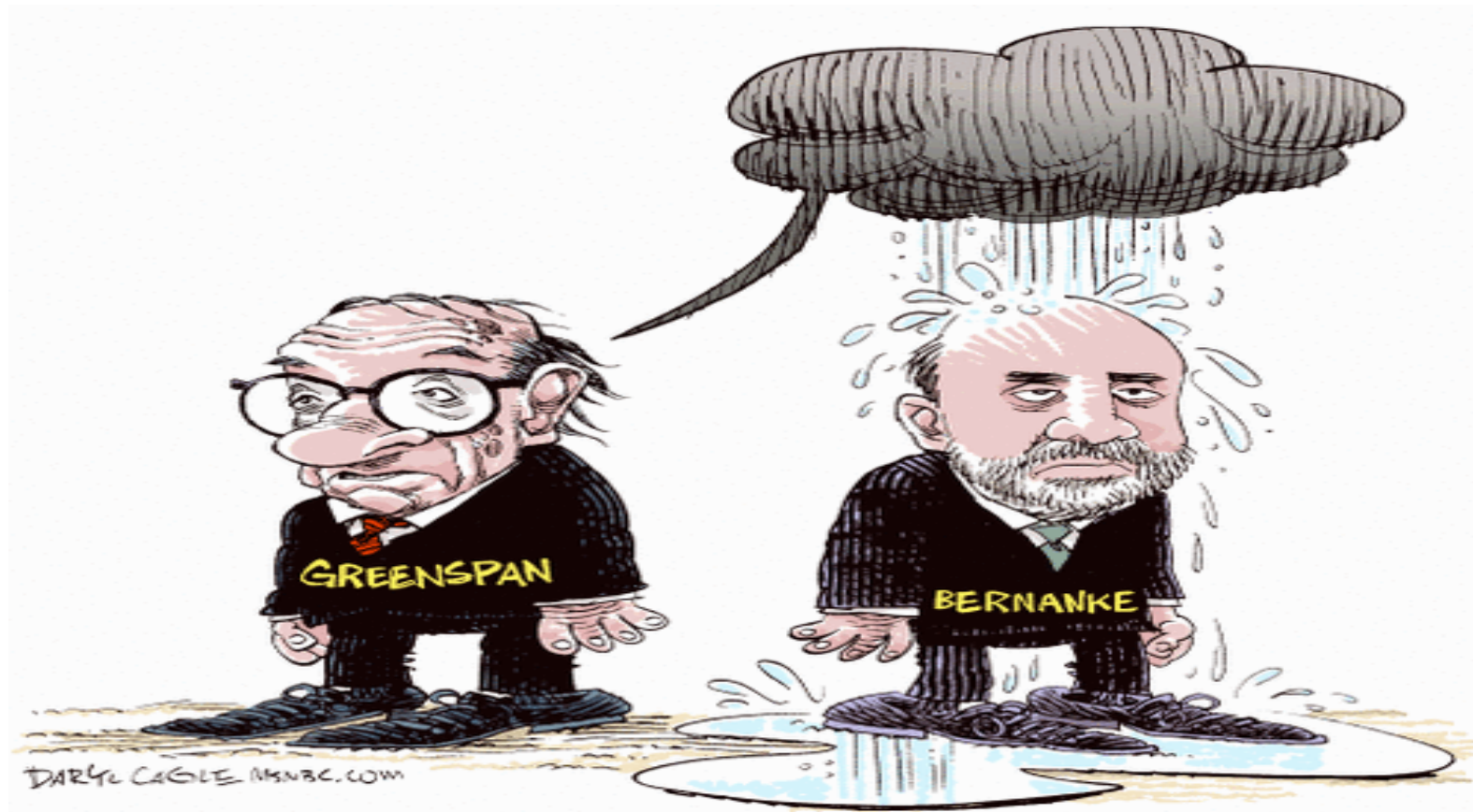
Lehman Brothers Anti-Benchmark Euro Eq

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How to Invest in Uncertain Times



Di cosa parleremo

- Vendere allo scoperto



Da non confondere.....



Arbitraggio

- In [economia](#) e in [finanza](#), un **arbitraggio** è un'operazione che consiste nell'acquistare un bene o un'attività finanziaria su un [mercato](#) rivendendolo su un altro mercato, sfruttando le differenze di [prezzo](#) al fine di ottenere un [profitto](#). L'operazione è possibile se il guadagno che si ottiene supera i costi per il trasferimento del bene trattato da un mercato all'altro. L'intera operazione deve essere senza alcun rischio per l'operatore.
- L'arbitraggio si differenzia dalla [speculazione](#) per il fatto che, mentre il primo è un modo di lucrare sulle differenze di prezzo presenti in luoghi diversi, la seconda opera sulle differenze di prezzo di uno stesso bene in tempi diversi: mentre la speculazione ricerca il lucro giocando sul fattore "tempo" (vendita successiva all'acquisto e viceversa), l'arbitraggio lo ricerca nel fattore "spazio" (acquisto e vendita su due mercati diversi).
- **Fonte: Wikipedia**

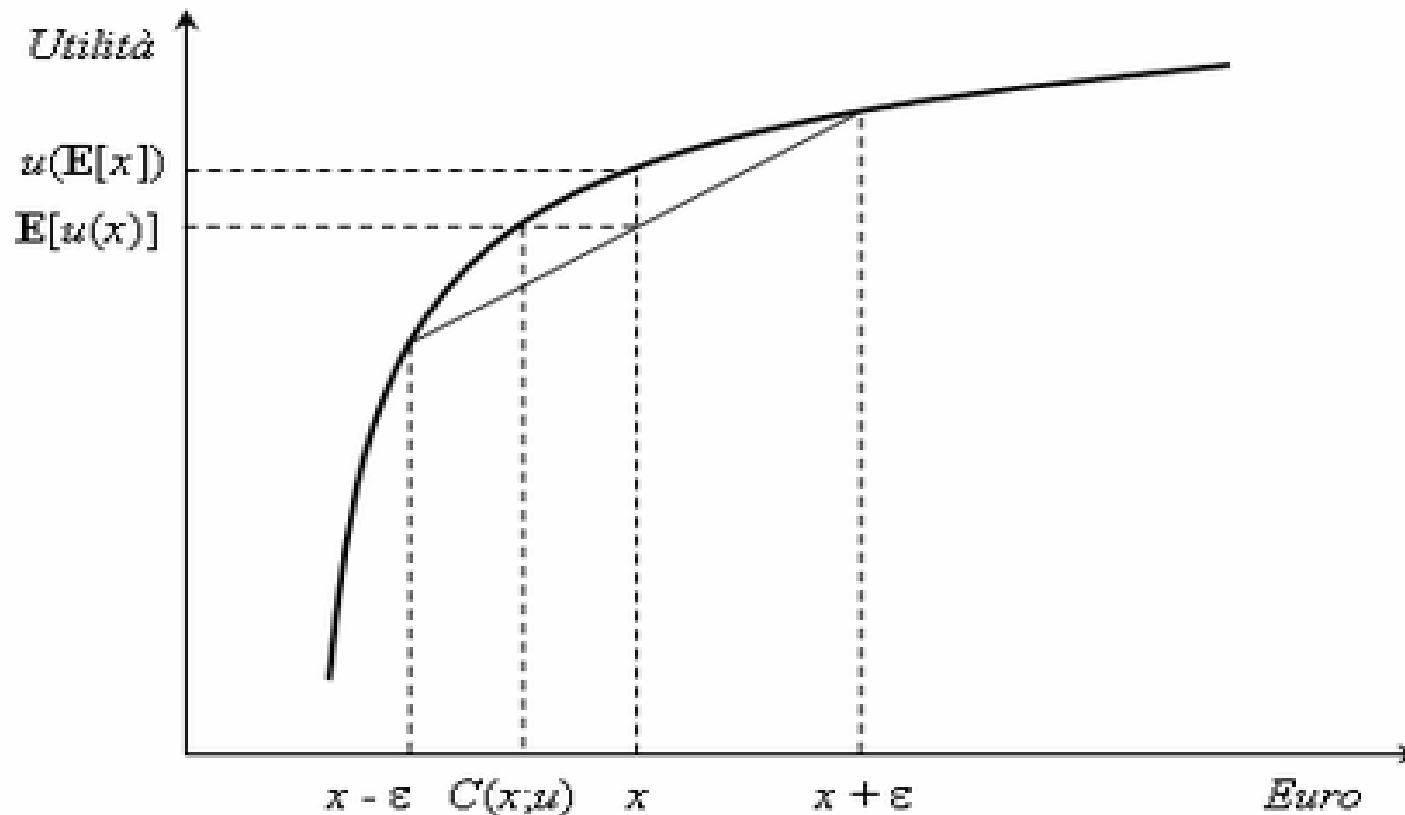
Da non confondere....



Incertezza



Equivalente certo avversione al rischio



Un consumatore sarà in altre parole indifferente tra ottenere il paniere di consumo rappresentato dall'equivalente certo *con certezza*, o il consumo aleatorio derivante dalla lotteria

VAN e TIR



E molto altro.....

Financial Crisis

1. Derivatives
2. Real options and Investment decisions



Subprime Mortgage



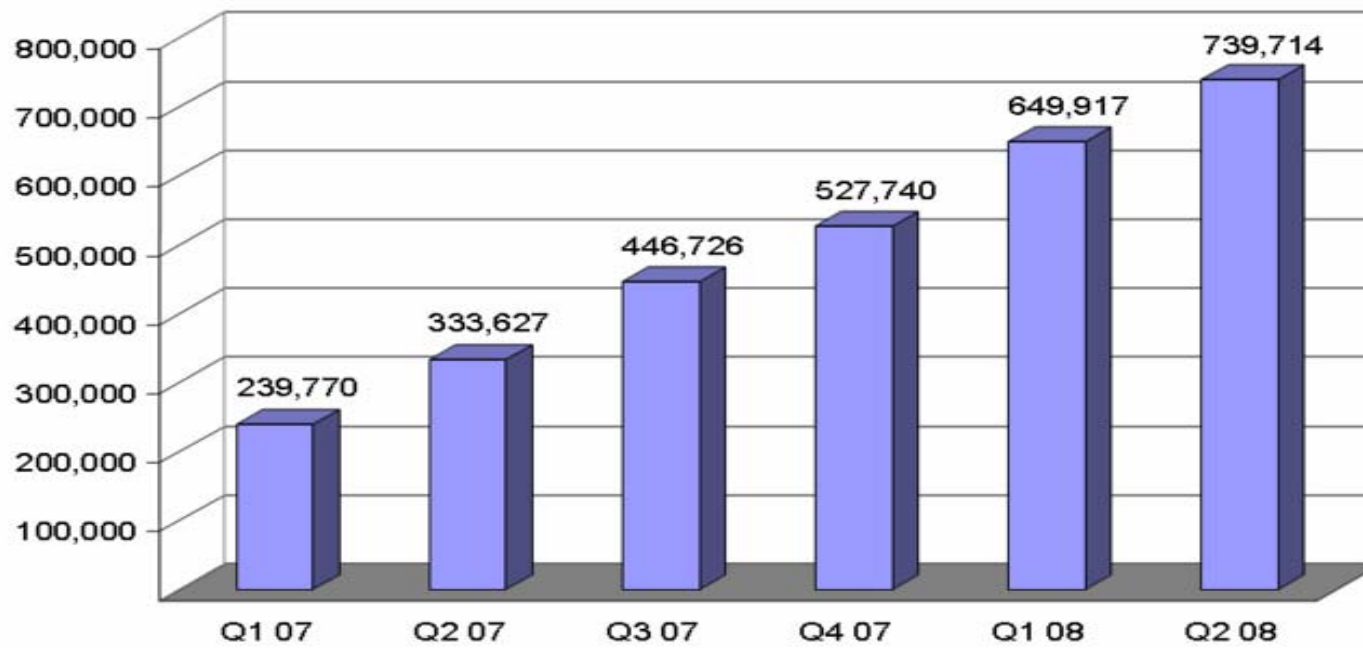
Crisis' roots

- **Subprime mortgage crisis** is an ongoing economic problem which became more apparent during 2007 and 2008. It is characterized by a combination of causes such as home mortgage "walk aways" (negative equity), loan defaults as a result of risky lending and borrowing practices, housing speculation, securitization, lack of regulation, low interest rates, and excessive individual and corporate debt levels.

- These have caused multiple adverse effects on the world economy such as contracted liquidity in the global credit markets and banking system
- Subprime lending is the practice of making loans to borrowers who do not qualify for market interest rates owing to various risk factors, such as income level, size of the down payment made, credit history, and employment status. The value of U.S. subprime mortgages was estimated at \$1.3 trillion as of March 2007

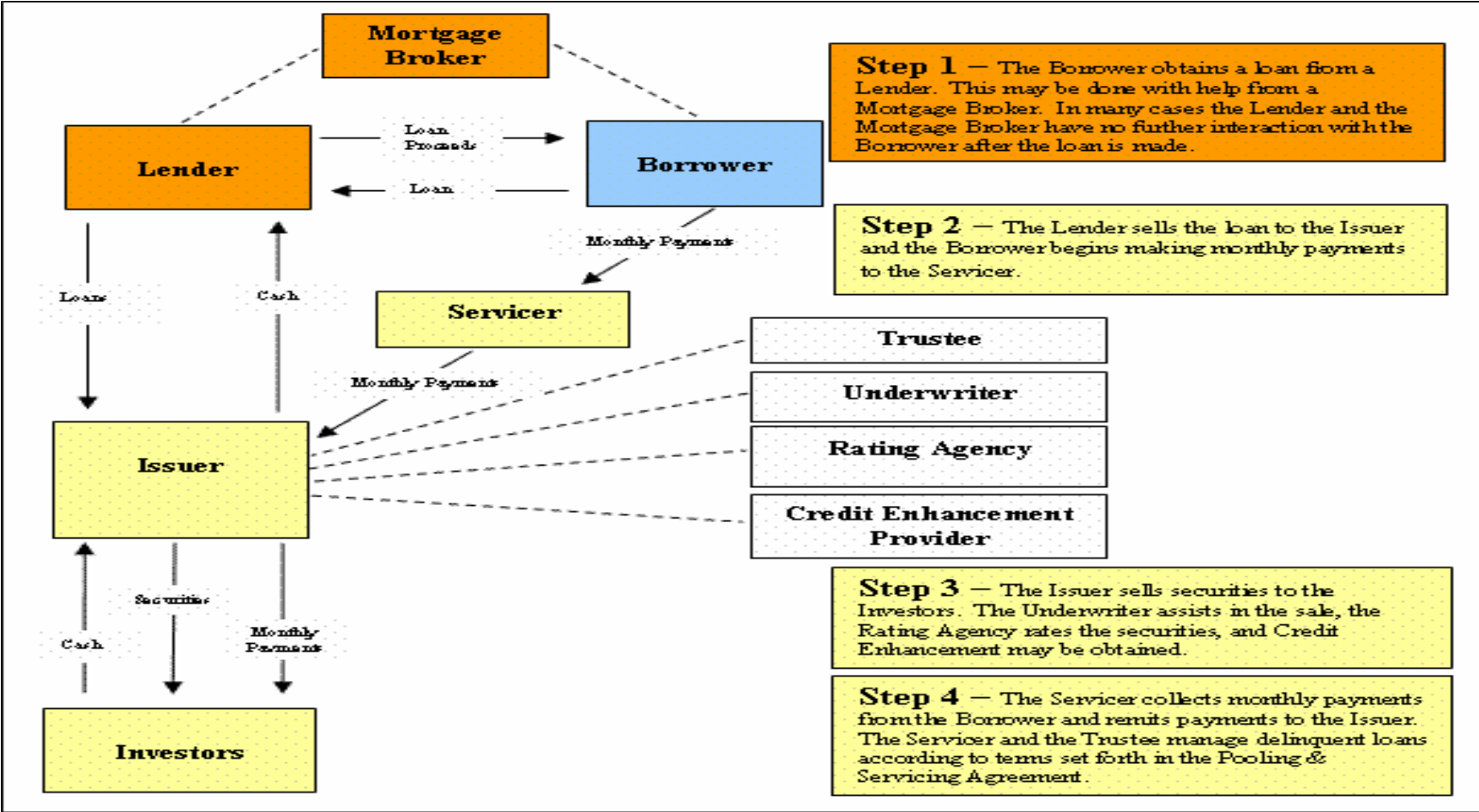


Properties with Foreclosure Activity



Source Data: RealtyTrac Press Releases of "U.S. Foreclosure Market Report"
Chart Created by Contributor

- **Securitization** is a structured finance process, which involves pooling and repackaging of cash-flow producing financial assets into securities that are then sold to investors. The name "securitization" is derived from the fact that the form of financial instruments used to obtain funds from the investors are securities.
- All assets can be securitized so long as they are associated with cash flow. Hence, the securities which are the outcome of securitization processes are termed asset-backed securities (ABS). From this perspective, securitization could also be defined as a financial process leading to an emission of ABS.



Mortgage Broker

Lender

Borrower

Servicer

Issuer

Trustee

Underwriter

Rating Agency

Credit Enhancement Provider

Investors

Loan Proceeds

→

Loan

←

Monthly Payment

→

Monthly Payment

→

Loans

↓

Cash

↑

Securities

↓

Cash

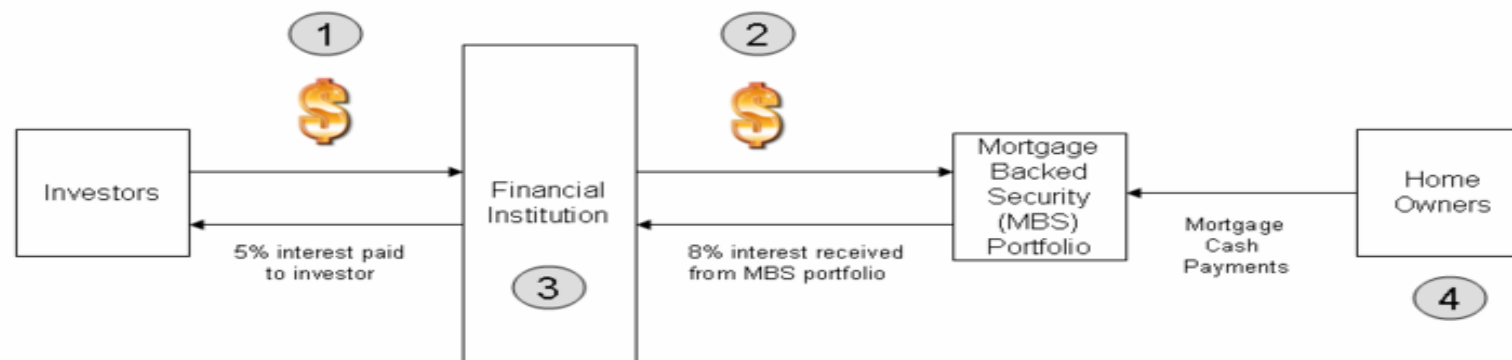
↑

Monthly Payment

↓

- **Understanding the risks of default**
- Traditionally, banks lent money to homeowners for their mortgage and retained the risk of default, called credit risk. However, due to financial innovations, banks can now sell rights to the mortgage payments and related credit risk to investors, through a process called securitization. The securities the investors purchase are called mortgage backed securities (MBS) and collateralized debt obligations (CDO). This new "originate to distribute" banking model means credit risk has been distributed broadly to investors, with a series of consequential impacts. There are four primary categories of risk involved: credit risk, asset price risk, liquidity risk, and counterparty risk. Each of these risk types is described separately in the background information.

Understanding the Financial Leverage Profit Engine



- 1) Let's say an investment bank borrows money from an investor or money market fund and agrees to pay a 5% interest rate. The MBS portfolio is collateral, which the investors can seize in the event of a default on interest payments.
- 2) The investment bank uses the funds to expand its MBS portfolio, which is paying an 8% interest rate (perhaps due to some higher-risk mortgages comprising the MBS). The 3% difference between the amounts is called the "spread."
- 3) For every \$100 invested in this manner, the investment bank gets \$3 profit margin ($\$100 \times 3\% = \3). This provides an incentive to borrow and invest as much as possible, known as "leveraging." This was considered safe during the housing boom (through early 2007), as MBS portfolios typically received high credit ratings and defaults were minimal. Since investment banks do not have the same capital reserve requirements as depository banks, many borrowed and lent amounts exceeding 30 times their net worth. By contrast, depository banks rarely lend more than 15 times their net worth. Freddie Mac was leveraged nearly 70 times its net worth.
- 4) With increasing delinquencies and foreclosures during 2007-2008, the value of the MBS portfolios declined. Investors became concerned and in some cases demanded their money back, resulting in margin calls (immediate need to sell/liquidate the MBS portfolios at fire-sale prices) to pay them. At such a high leverage amount, many investment banks and mortgage companies suffered huge losses, bankruptcy, or merged with other institutions.
- 5) Because MBS securities are now considered "toxic" due to uncertainty in the housing market and cannot be sold readily (i.e., they are "illiquid"), their values have plummeted. The market value is penalized by the inability to sell the MBS; it may be less than the value the actual cash inflow would merit.
- 6) The ability of financial institutions to obtain funds in this manner via MBS has been dramatically curtailed. Spreads have narrowed, as investors are demanding higher returns to lend money to highly leveraged institutions.

Causes of the crisis

- The reasons for this crisis are varied and complex. The crisis can be attributed to a number of factors pervasive in both the housing and credit markets, which developed over an extended period of time. Some of these include: the inability of homeowners to make their mortgage payments; poor judgment by the borrower and/or the lender; speculation and overbuilding during the boom period; risky mortgage products; high personal and corporate debt levels; financial innovation that distributed and perhaps concealed default risks; central bank policies; and regulation (or lack thereof)
- A combination of **low interest rates** and **large capital inflows** from outside the U.S. created a surplus of loanable funds and easy credit for many years leading up to the crisis.

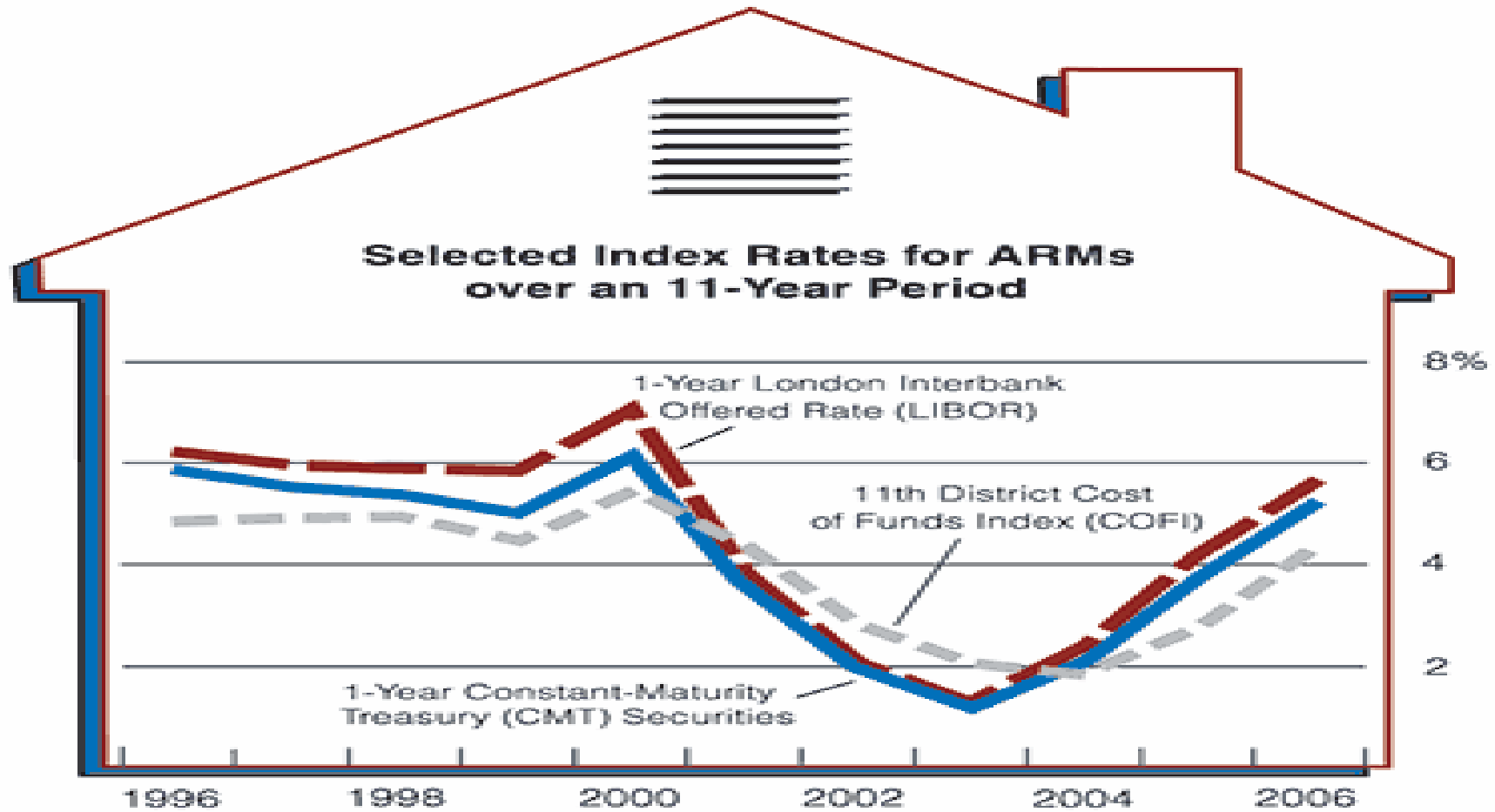
U.S. Existing Home Sales, Inventory, and Months Supply December 2005 – June 2008



Each sales data point (blue line) is annualized based on the most recent month's rate of sale.
 The inventory figure (green line) represents the number of homes for sale at a point in time.
 The inventory months to sell (red line) is how many months it would take to sell the existing inventory.

Source Data: National Association of Realtors (NAR)
 Chart Created by Contributor

Adjustable Rate Mortgages



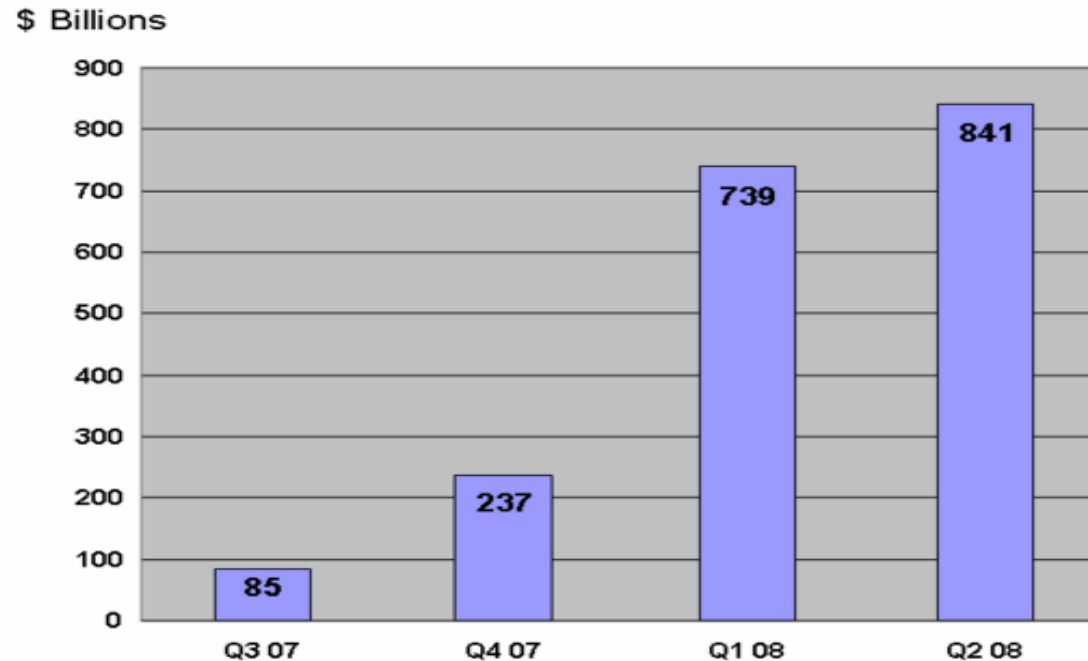
Inaccurate credit ratings

- Credit Rating Agency are now under scrutiny for giving investment-grade ratings to securitization transactions (CDOs and MBSs) based on subprime mortgage loans.
- Critics claim that conflicts of interest were involved, as rating agencies are paid by the firms that organize and sell the debt to investors, such as investment banks

Inaccurate credit ratings

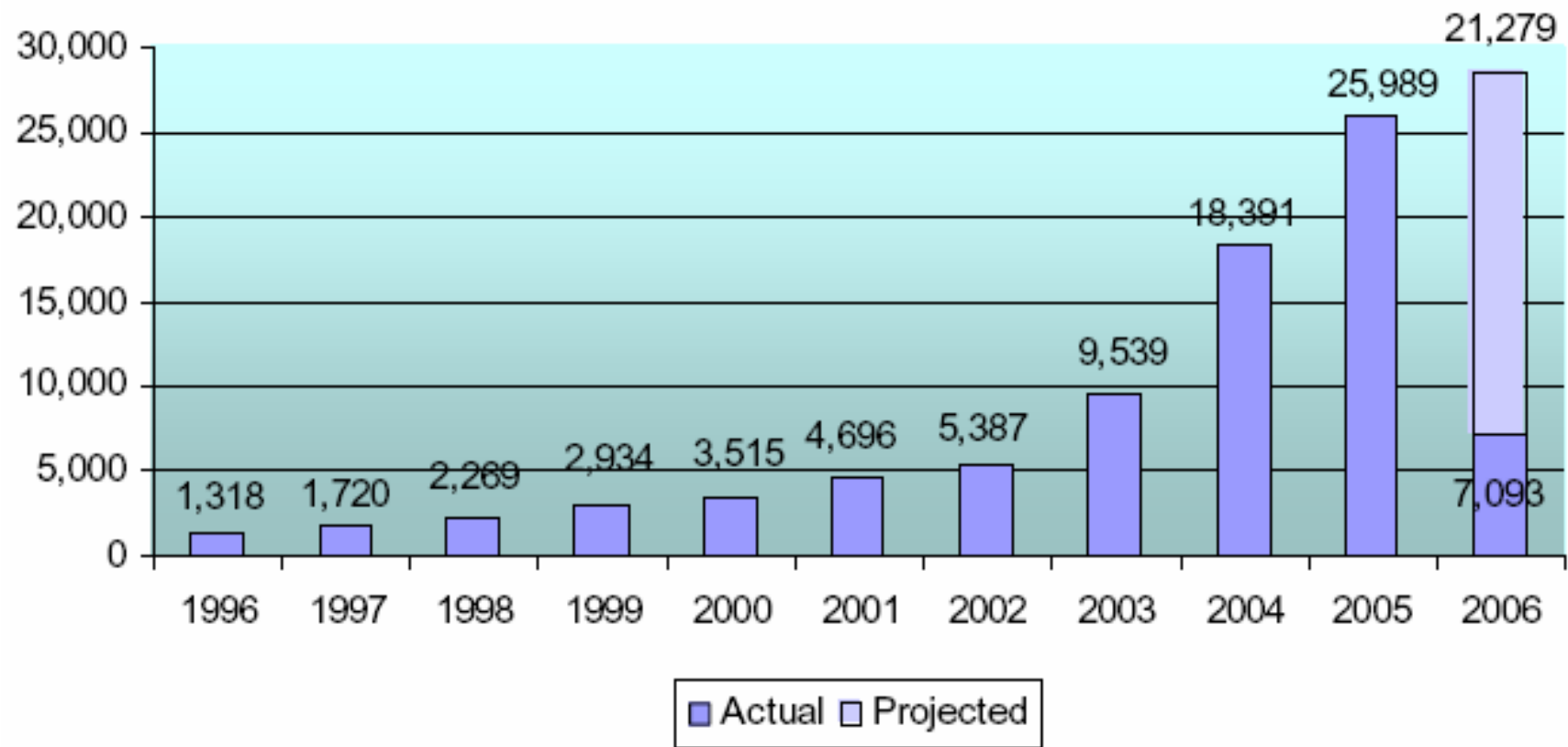
Mortgage-Backed Securities (MBS) Downgrades

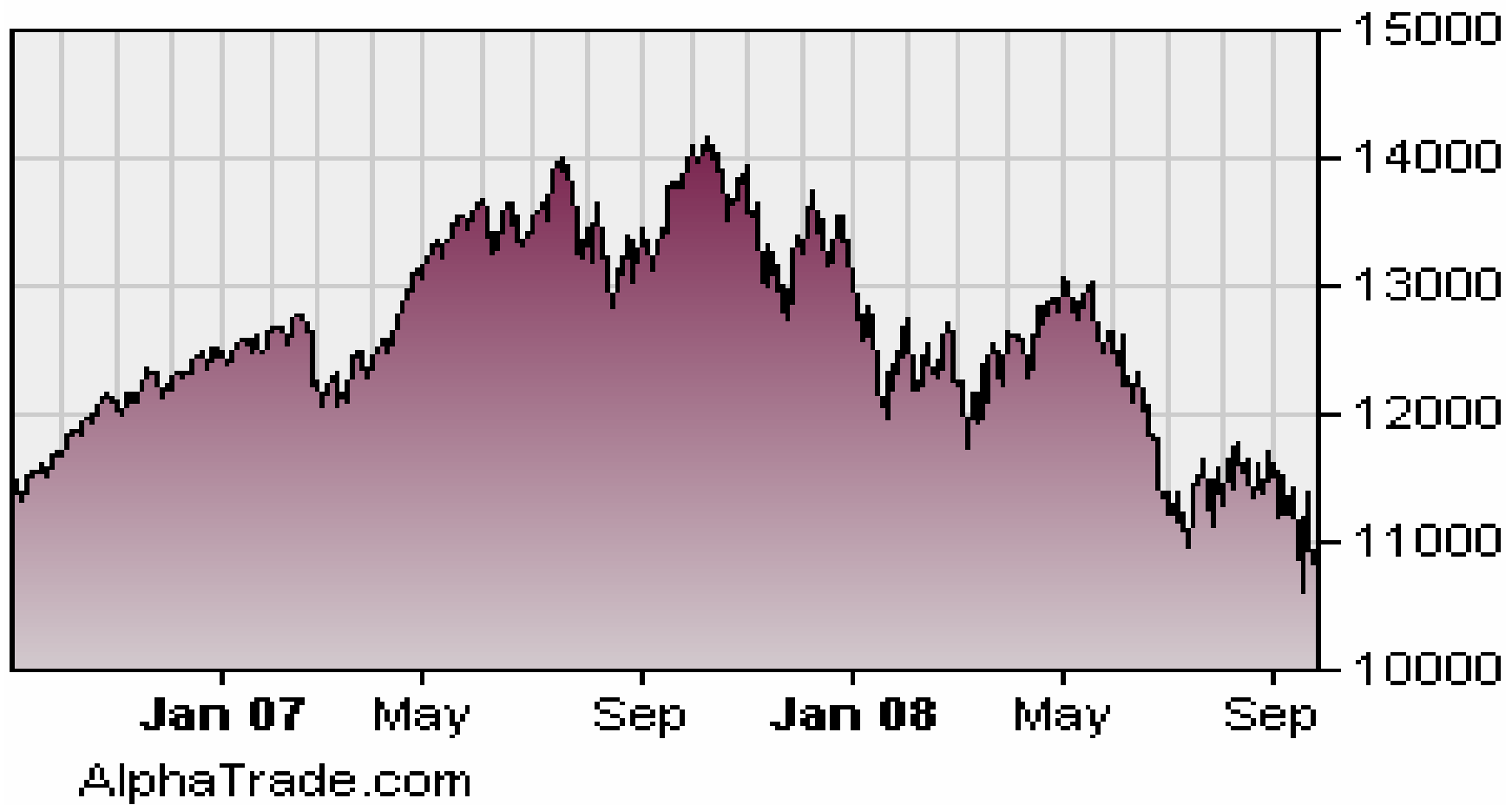
Rating agencies (e.g., S&P and Moody's) have downgraded the credit ratings on nearly \$1.9 trillion in MBS. This places pressure on financial institutions holding these securities to write down their value, potentially requiring banks to acquire additional capital.

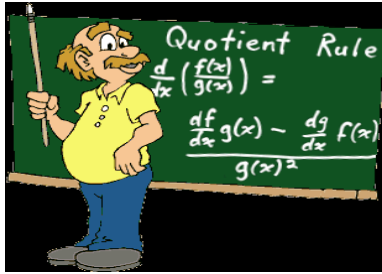


Source data: Fortune Magazine, 8/4/08

MORTGAGE LOAN FRAUD REPORTING TREND



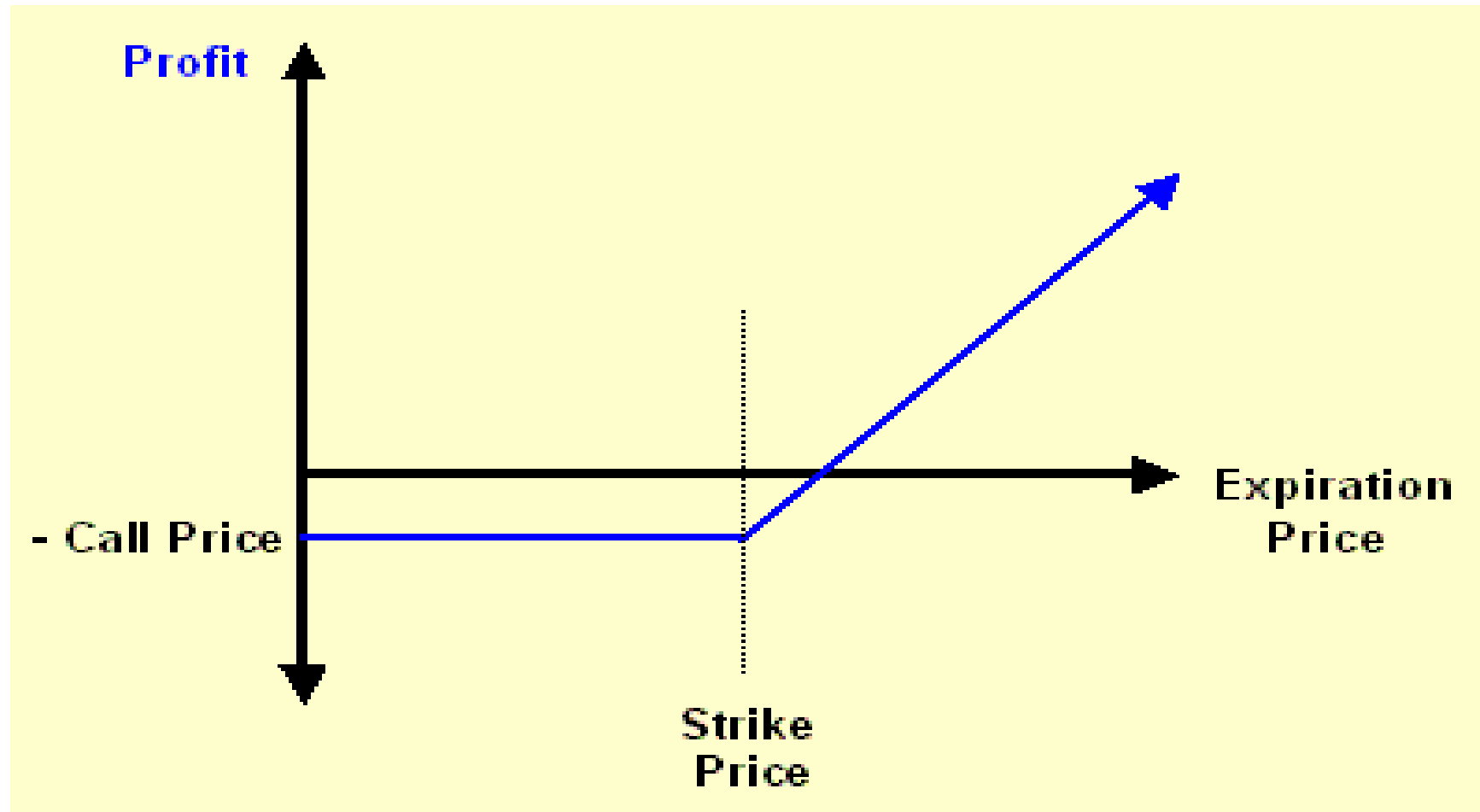




DERIVATIVES

- **A credit derivative** is a derivative whose value derives from the credit risk on an underlying bond, loan or other financial asset. In this way, the credit risk is on an entity other than the counterparties to the transaction itself.[1] This entity is known as the *reference entity* and may be a corporate, a sovereign or any other form of legal entity which has incurred debt.[2] Credit derivatives are bilateral contracts between a buyer and seller under which the seller sells protection against the credit risk of the reference entity

Call Option



Funzioni dei mercati finanziari (MF)

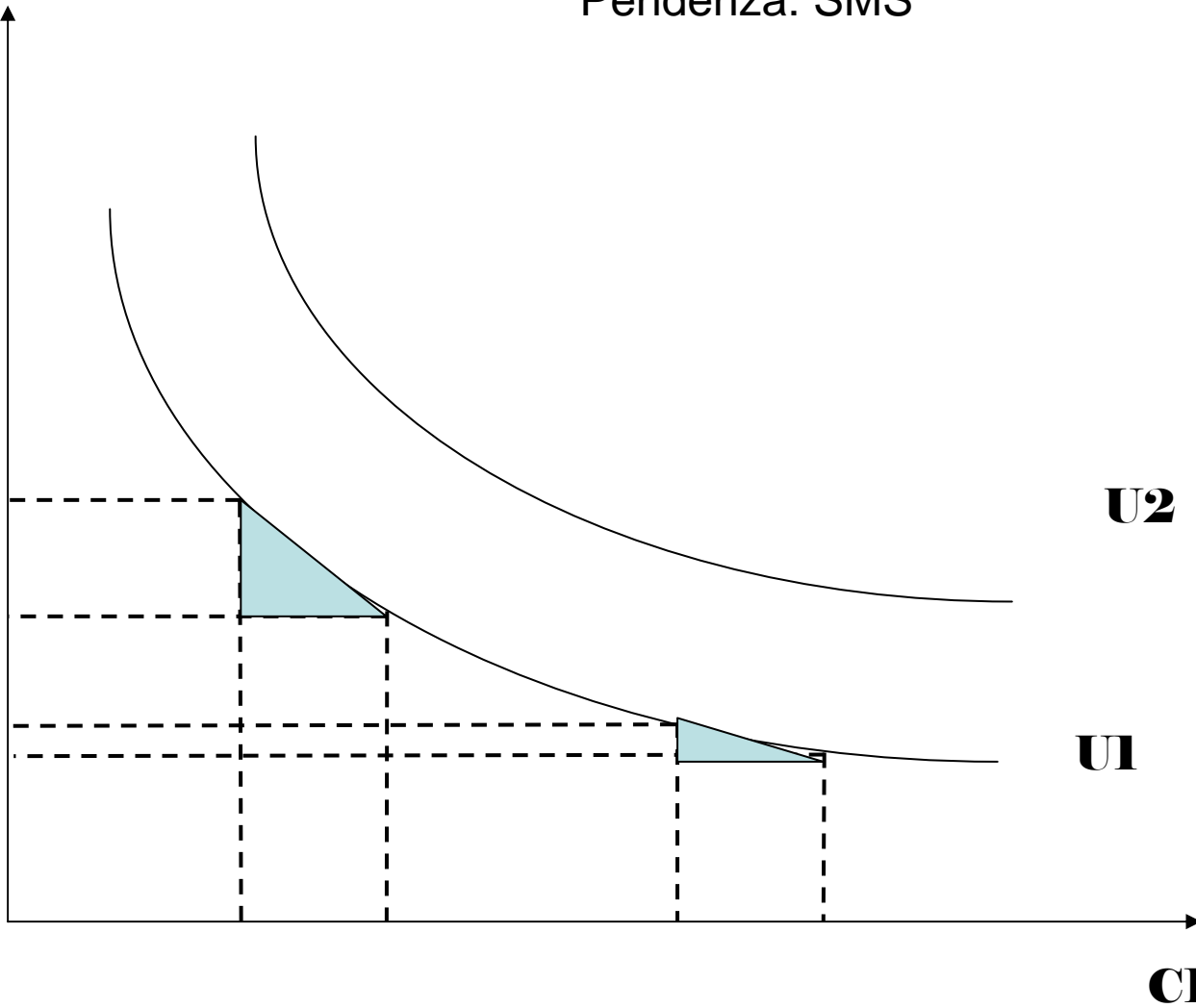
- Cap. 2 Pittaluga pag. 24
- L'esistenza dei mercati finanziari dipende dalla mancata coincidenza fra il soggetto che investe e quello che risparmia.
- Copeland and Antikarov, Opzioni Reali, Il Sole 24 ore
- Trigeorgis, Real Options
- Dixit and Pindyck, Investment under Uncertainty
- Opzioni Reali, C. D'Alpaos, M. Moretto and S. Vergalli

MF (2): un modello I

- Ipotesi:
- Assenza di mercati finanziari → assenza di tasso di interesse
- Un individuo vive due periodi con redditi pari a Y_1 e Y_2
- L'obiettivo è quello di massimizzare la sua utilità consumando C_1 e C_2
- Dove $U(C_1)$ e $U(C_2)$

C2

Pendenza: SMS



U2

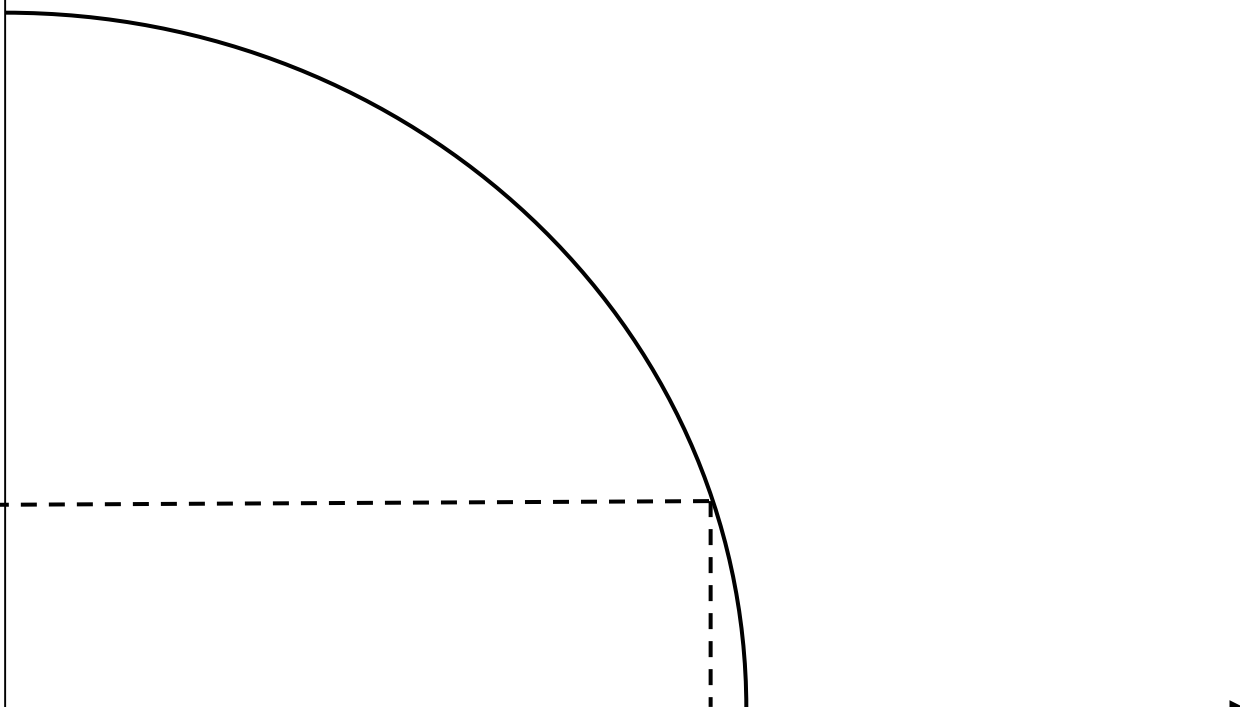
U1

C1

C2



SET DELLE
OPPORTUNITA' DI
PRODUZIONE



C2

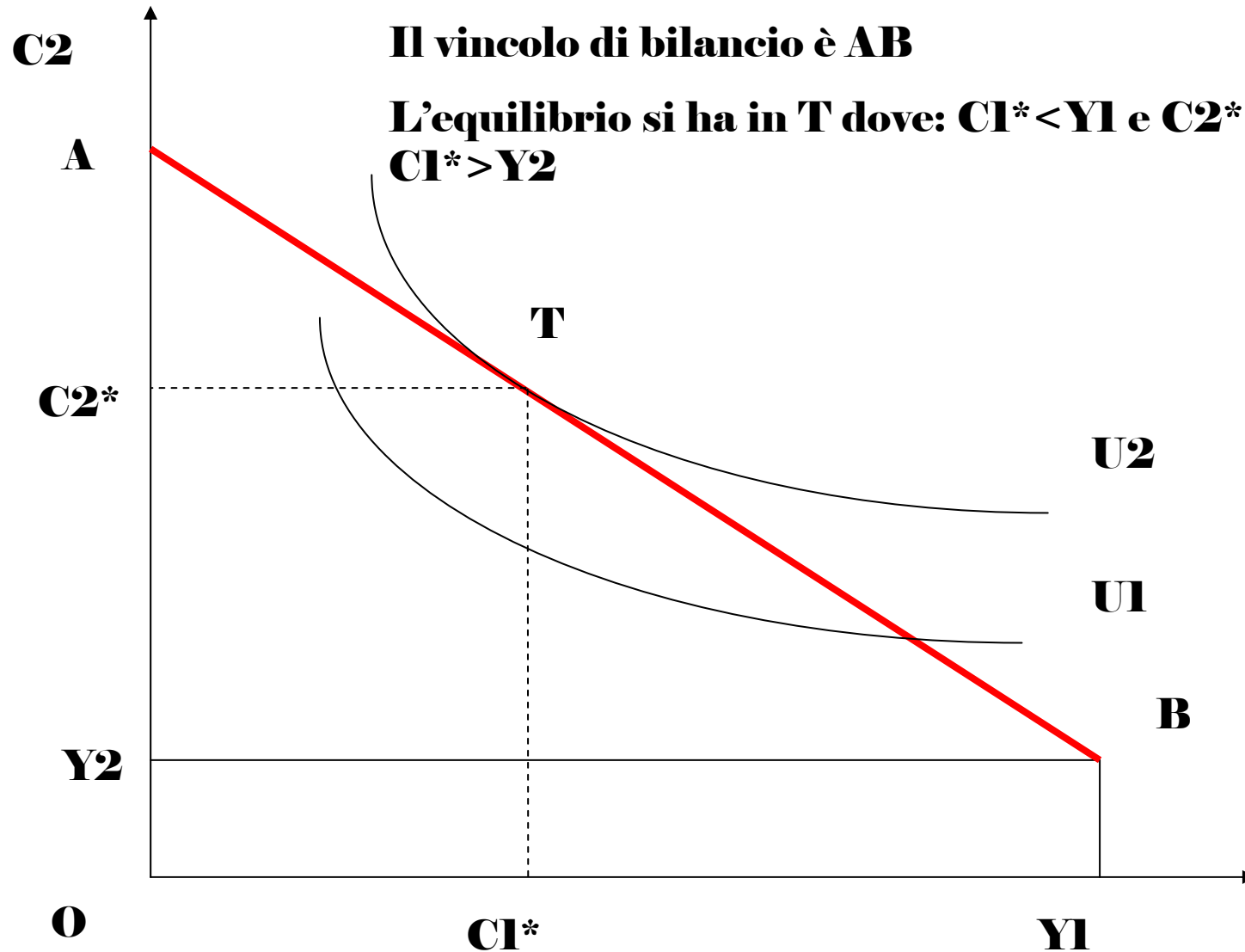
C1

C1

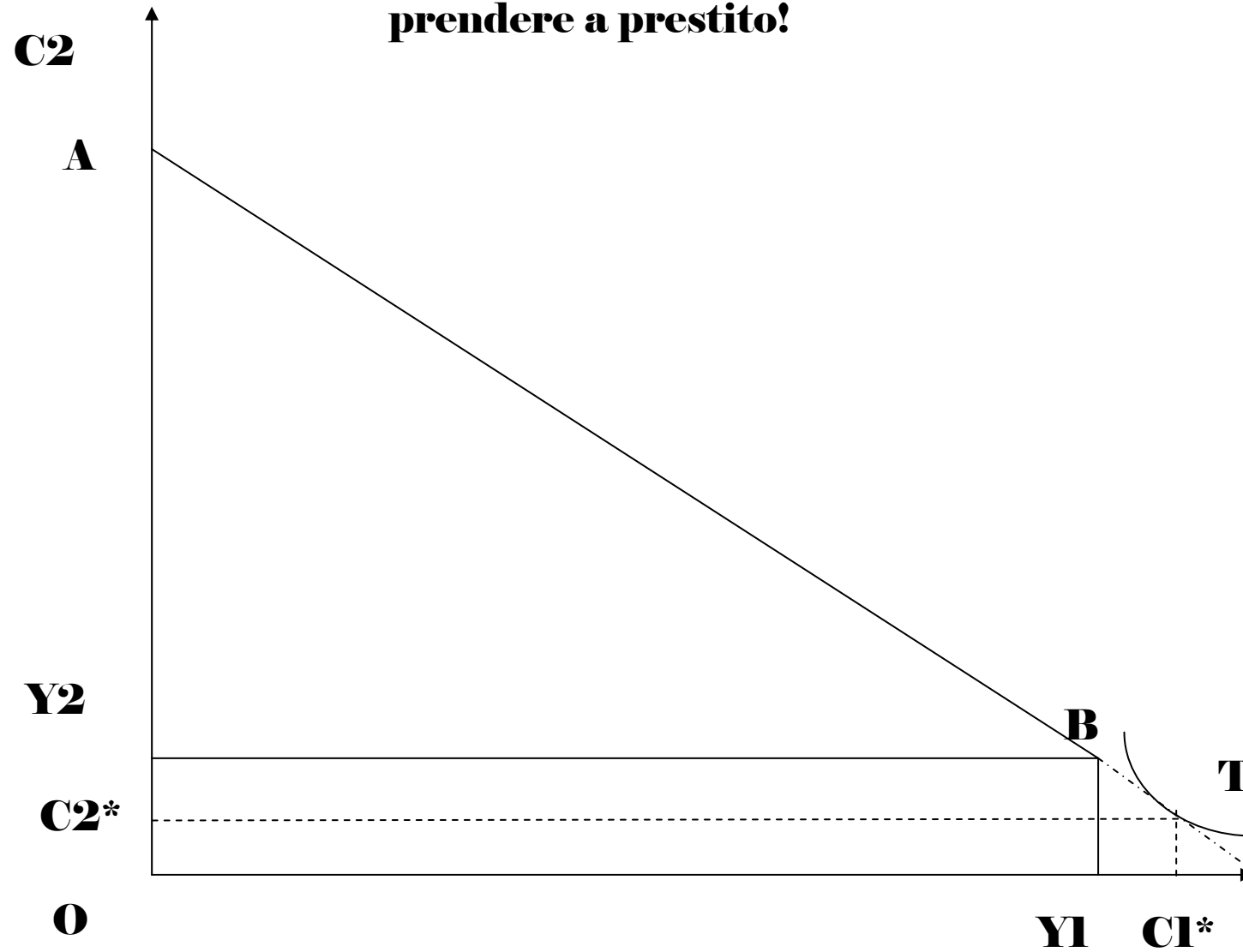
Sia il reddito pari a Y_1 in t_1 e Y_2 in t_2 , l'individuo, se rinuncia a consumare nel primo periodo, ha $OA = Y_1 + Y_2$ per il secondo periodo.

Il vincolo di bilancio è AB

L'equilibrio si ha in T dove: $C_1^* < Y_1$ e $C_2^* = Y_1 + Y_2 - C_1^* > Y_2$



In questo caso l'individuo otterrebbe una soddisfazione maggiore se consumasse in T $C1^* > Y1$ e $C2^* < Y2$ ma ciò non può avvenire perché non può prendere a prestito!



Mercati finanziari

- Se nel primo periodo NON si consuma il reddito, esso può essere reinvestito e può dare un rendimento pari a iY_1 , dove i è il tasso di interesse. Quindi nel secondo periodo l'agente può spendere

$$C_2 = Y_2 + Y_1 + iY_1 = Y_2 + Y_1(1+i) = OA_2$$

- Portando tale uguaglianza al primo periodo:

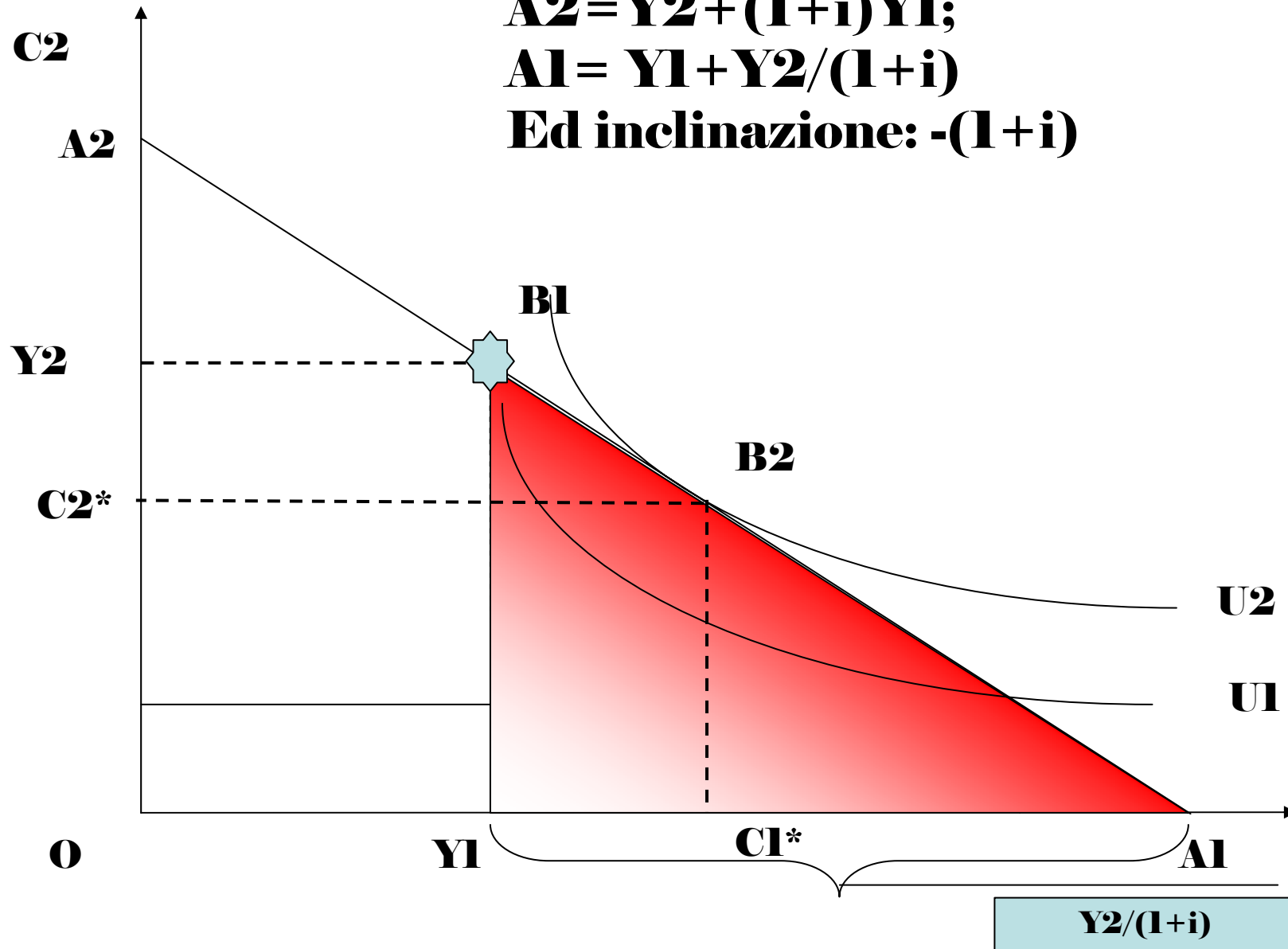
$$C_2/(1+i) = Y_2/(1+i) + Y_1$$

Il vincolo di bilancio ha le seguenti intercette:

$$A2 = Y2 + (1+i)Y1;$$

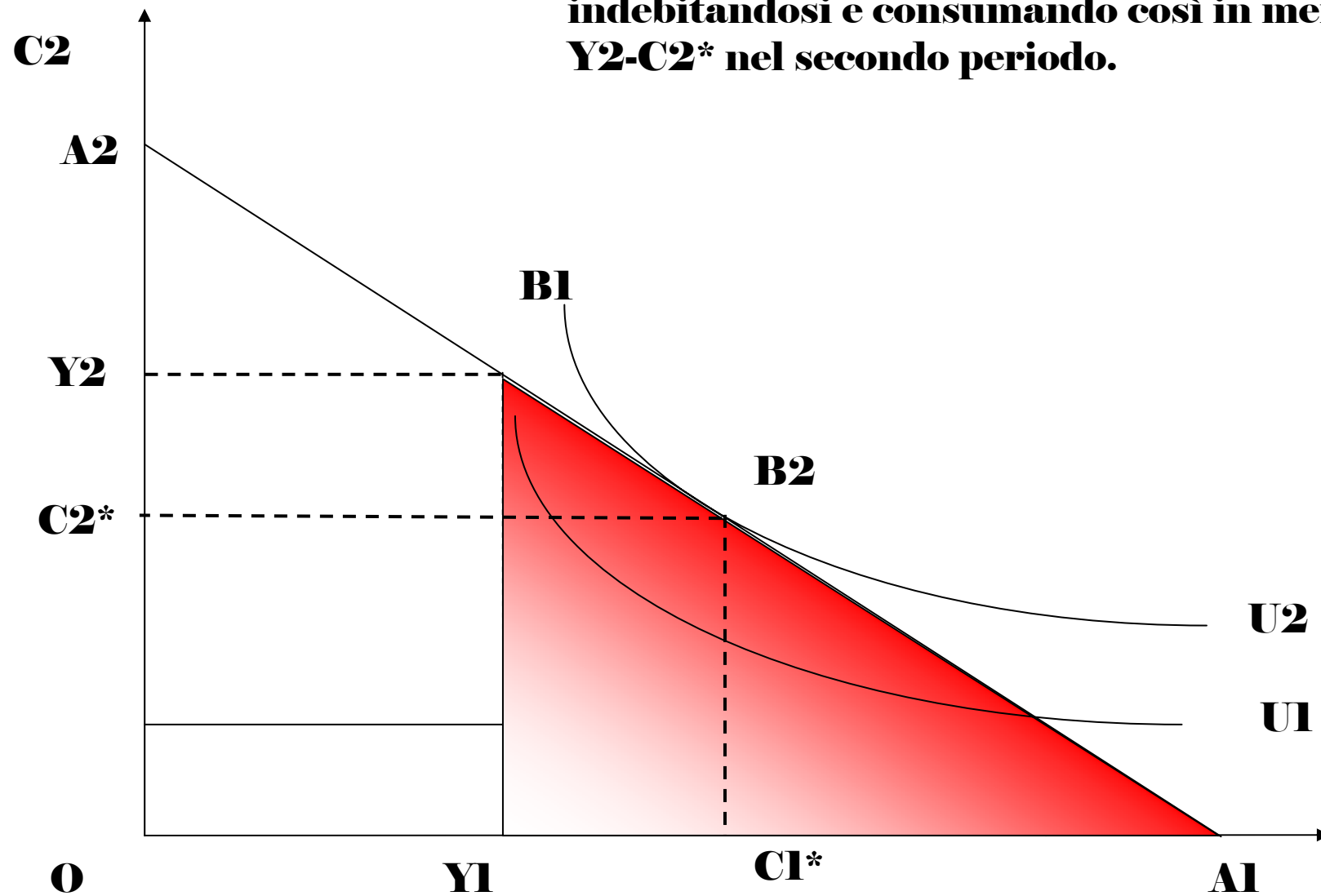
$$A1 = Y1 + Y2/(1+i)$$

Ed inclinazione: $-(1+i)$



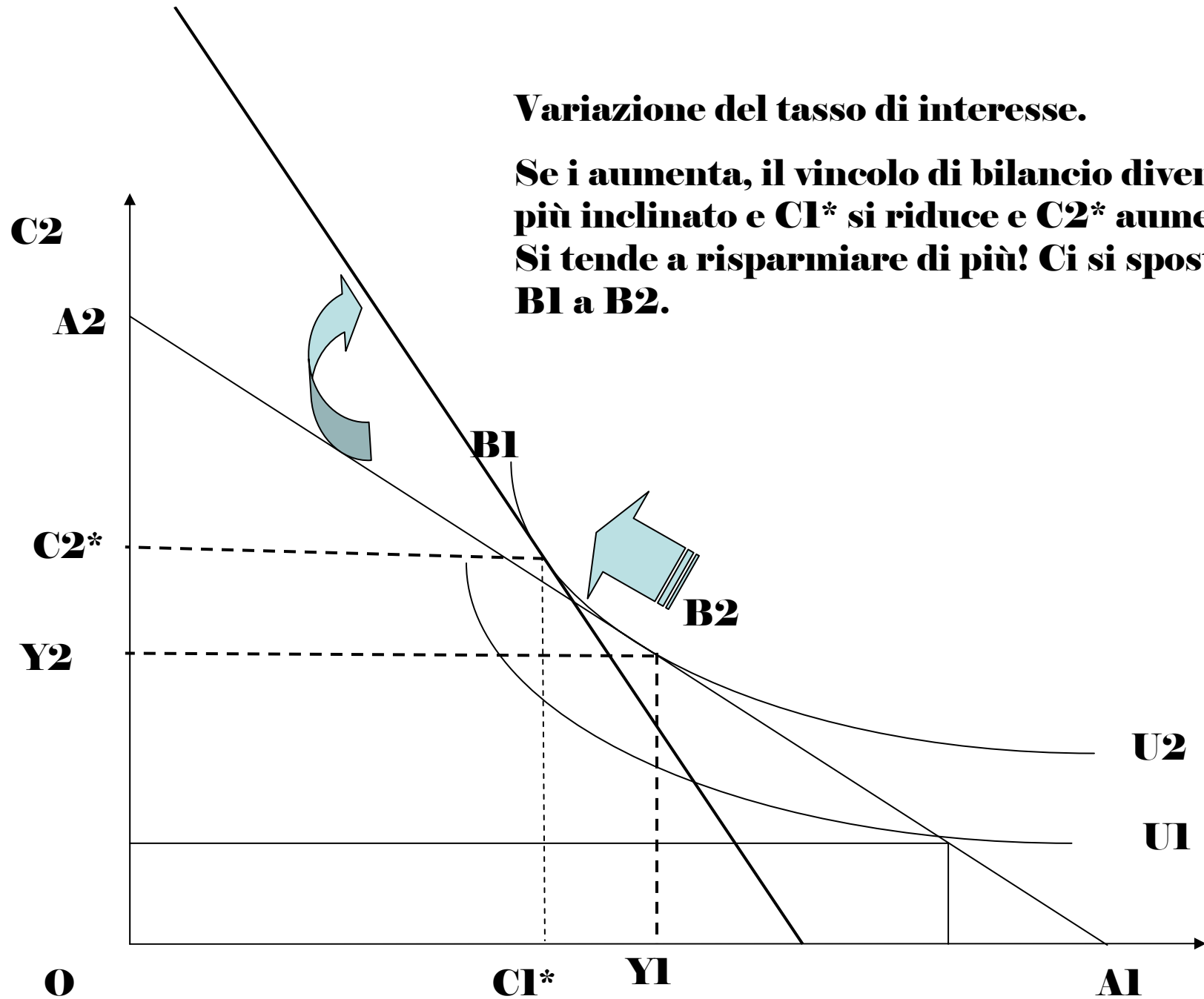
- In altri termini: nel primo periodo l'agente può indebitarsi per consumare più del suo reddito corrente. Vivendo solo due periodi l'agente può indebitarsi al massimo di $Y_2/(1+i)$. Quindi nel primo periodo al massimo può consumare:
 - $OA_1 = Y_1 + (Y_2/(1+i))$
- In presenza di mercati finanziari l'inclinazione della retta di bilancio è data da $1+i$. Infatti dalla figura:
 - $A_2Y_2/Y_2B_1 = Y_1(1+i)/Y_1 = 1+i$

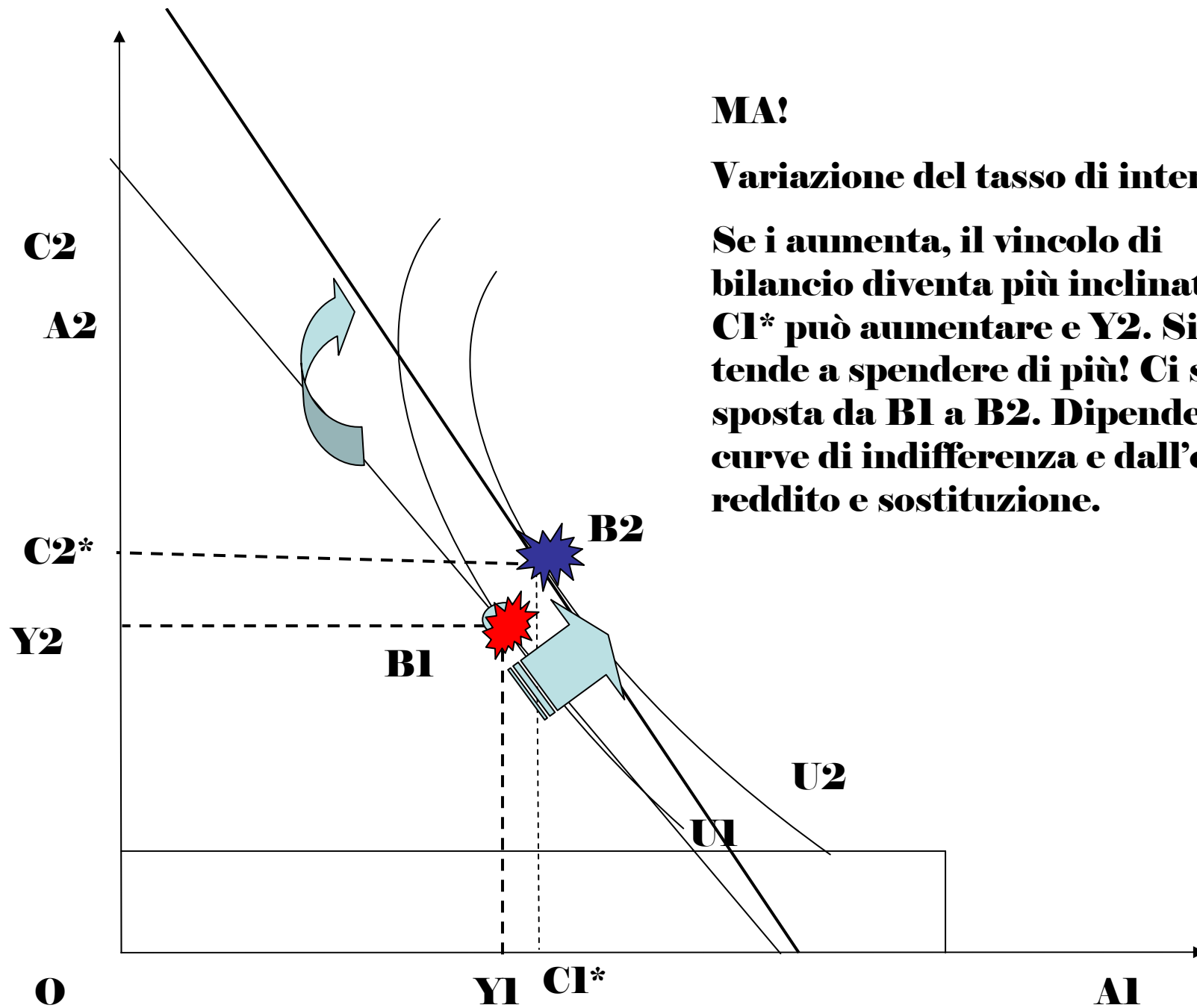
In presenza di mercati finanziari gli agenti possono arrivare a consumare $C1^* > Y1$, indebitandosi e consumando così in meno $Y2 - C2^*$ nel secondo periodo.



Variazione del tasso di interesse.

Se i aumenta, il vincolo di bilancio diventa più inclinato e $C1^*$ si riduce e $C2^*$ aumenta. Si tende a risparmiare di più! Ci si sposta da $B1$ a $B2$.





MA!

Variazione del tasso di interesse.

Se i aumenta, il vincolo di bilancio diventa più inclinato e CI^* può aumentare e Y_2 . Si tende a spendere di più! C_i si sposta da B_1 a B_2 . Dipende dalle curve di indifferenza e dall'effetto reddito e sostituzione.

C2

SCELTA

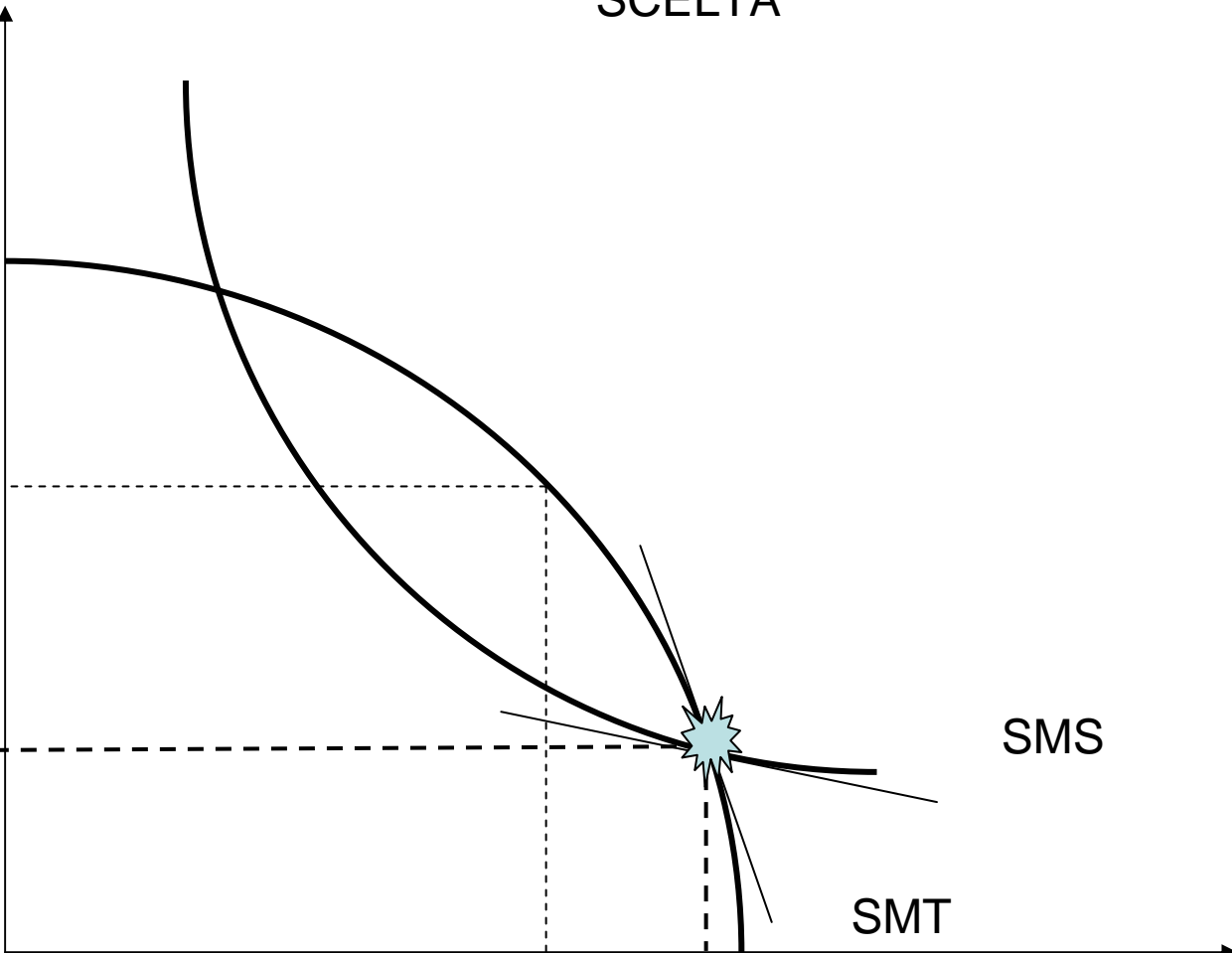
C2

SMS

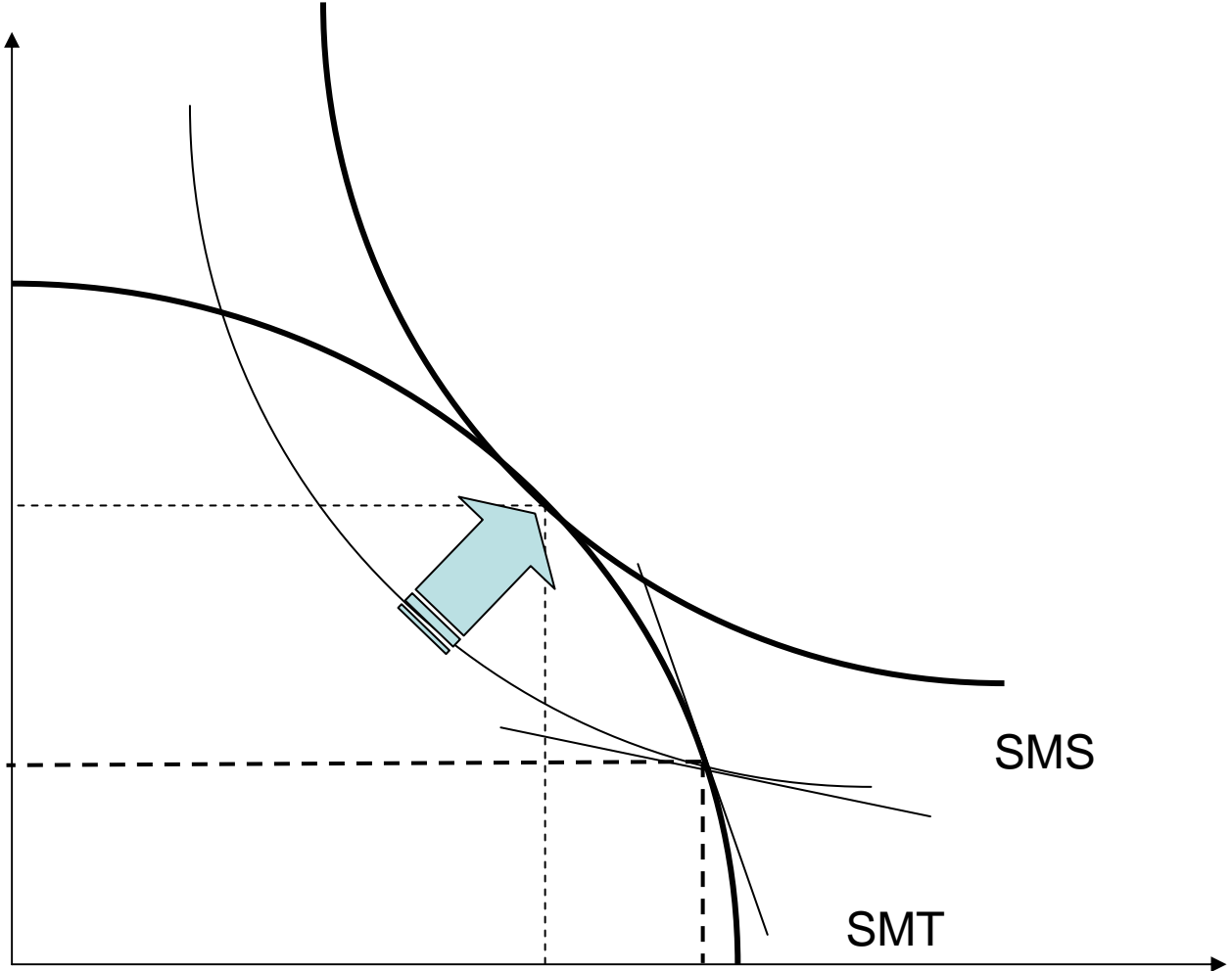
SMT

C1

C1



C2



SMS

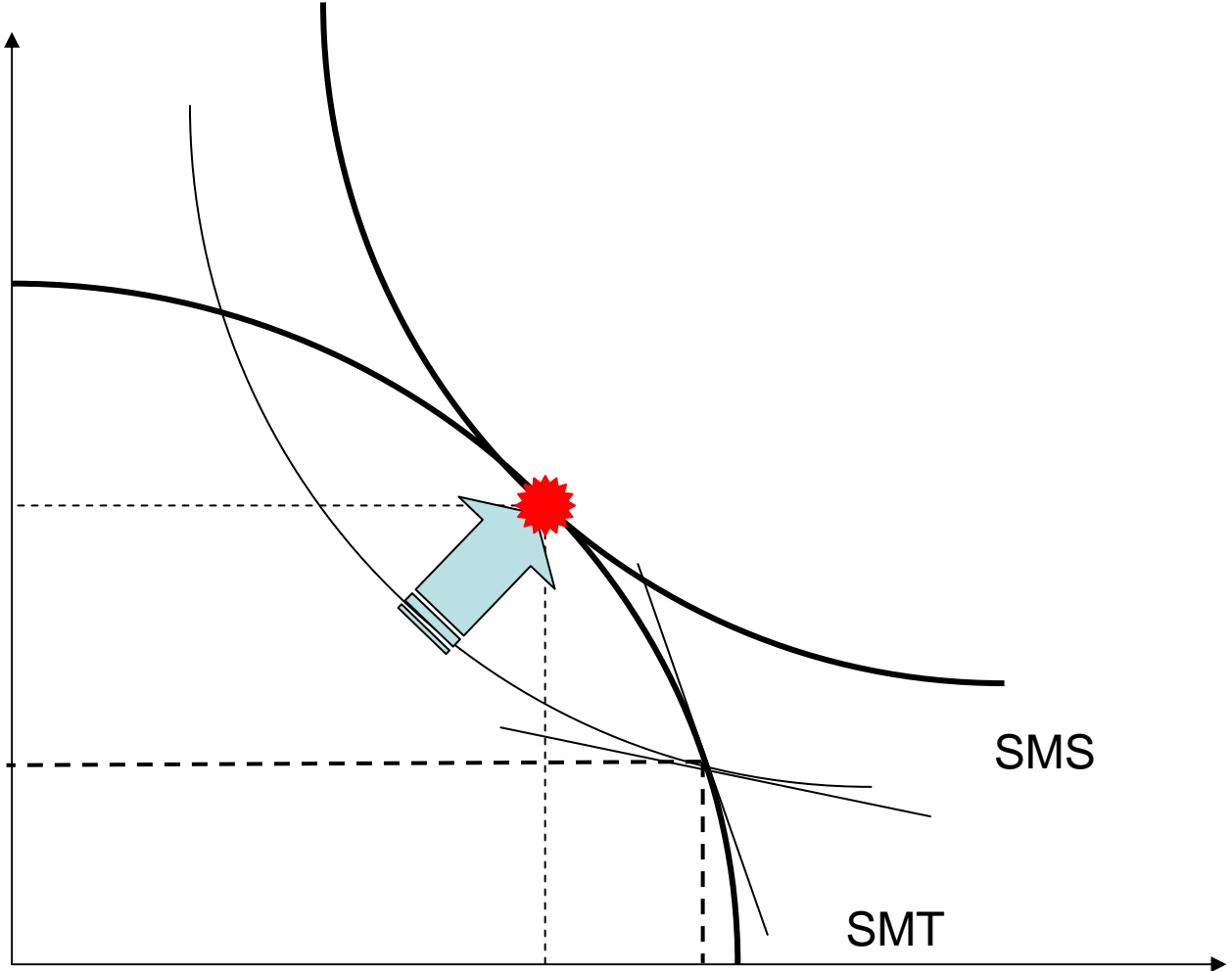
SMT

C1

C1

C2

C2



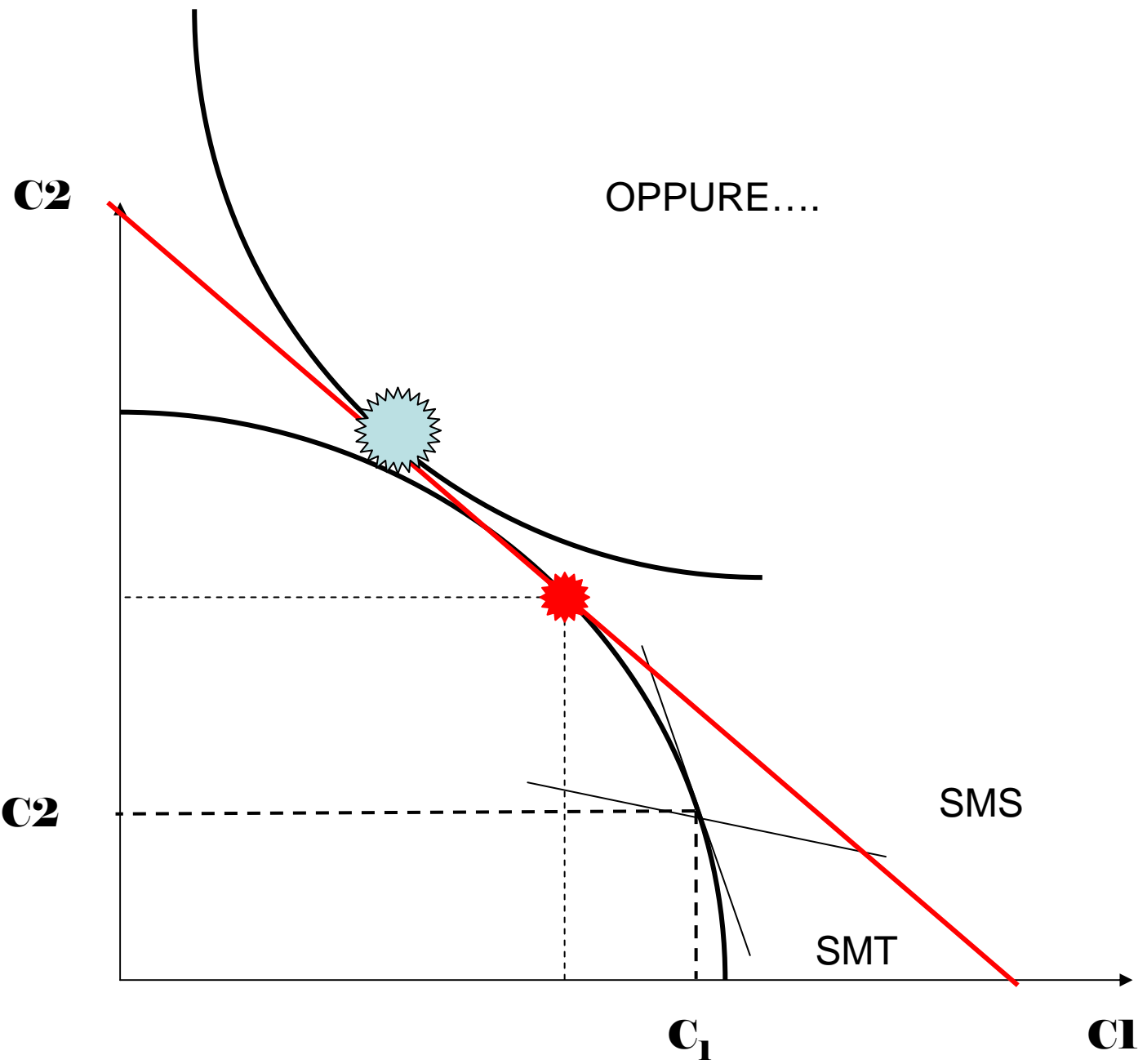
C2

C1

C1

SMS

SMT



Sergio Vergalli - Mozilla Firefox

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Current Position

- 2008 **Assistant Professor** of Economics, University of Brescia
- 2008 Lecturer of Economic Analysis of Investment Projects (*Analisi Economica dei Progetti di Investimento*) University of Brescia, Faculty of Economics.
"Lezione 1 e 2"; "slides1"; "Lezione 3 e 4"; "Capitolo 4"; "Capitolo 7";
- 2008 *Analisi Economica dei Progetti di Investimento: Downloadable Papers "1" "2" "3" "4" "5" "6" "7" "8" "9" "10" "11" "12" "13" "14" "15" "16" "17" "18" "19" "20" "21" "22" "23" "24" "25" "26" "27" "28" "29" "30" "31" "32" "33" "34" "35" "36" "37" "38" "39" "40" "41" "42" "43" "44" "45" "46" "47" "48" "49" "50" "51" "52" "53" "54" "55" "56" "57" "58" "59" "60" "61" "62" "63" "64" "65" "66" "67" "68"*
- 2007-2010 Researcher for CIRCE, at FEEM (Fondazione Eni Enrico Mattei).
- 2007-2010 Researcher for CMCC, Centro Euro-Mediterraneo per i Cambiamenti Climatici
- 2008 Research Fellow, PRIN project on "Telecomunicazioni, trasporti ed energia: analisi teorica della concorrenza in settori caratterizzati da reti bi-direzionali", University of Brescia.

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