International Cost of Capital

American Business Appraisers Network

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U.S. Cost of Equity Model

	Risk-free return (R_f)
+	Equity risk premium (ERP)
+/-	Industry risk premium/discount (IRP or β)
=	Cost of equity in diversified portfolio
+	Unsystematic risk premium (α or CSRP)
=	Cost of equity

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International Risk Considerations

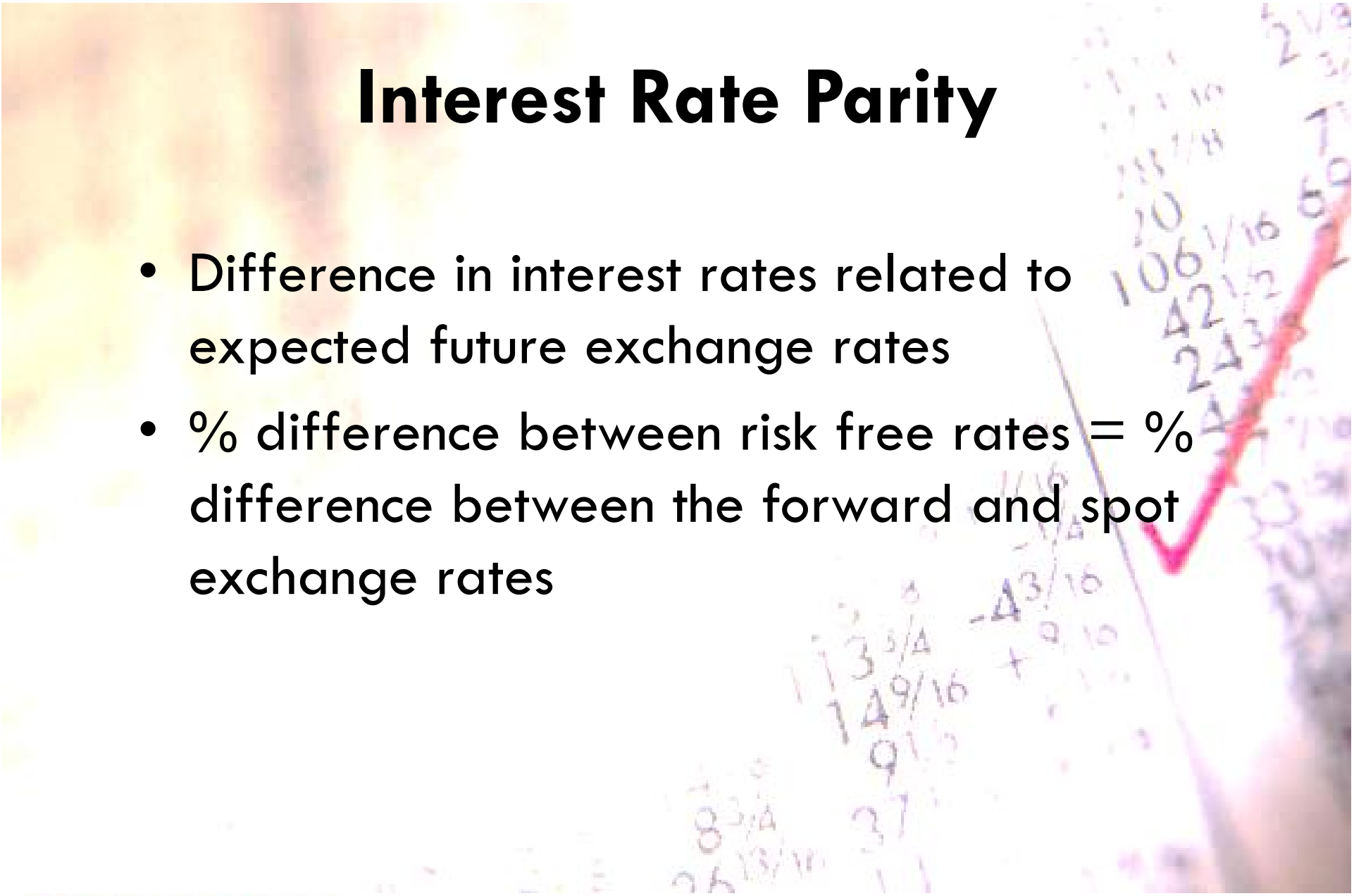
- Country equity markets and geo-political risk: Risk of volatility in fixed and equity investment returns
- Currency risk: Risk that inflation will cause currency in SuCo's economy to devalue
- Exchange rate risk: Similar to currency risk, risk that the exchange rate will be adjusted to compensate for currency inflation

International Economics

- Global currency and interest rates fluctuate against each other
- Global economic relationships
  - Interest rate parity
  - Expectations of forward exchange rates
  - The "Fisher Effect"
  - The "International Fisher Effect"
  - Purchasing Power Parity

Interest Rate Parity

- Difference in interest rates related to expected future exchange rates
- % difference between risk free rates = % difference between the forward and spot exchange rates



Interest Rate Parity

Example:

- 1.00 USD = 13.20 Mexican Peso (MP)
- U.S. government debt interest rate = 2.4%
- Mexican government debt interest rate = 5.9%
- Mexican Peso to USD forward exchange rate

  (1.059 ÷ 1.024) x 13.20 MP = 13.65 MP

Future Currency Expectations

- Given the interest rates above, expected currencies in one year:

  Mexico: 13.20 MP x 1.059 = 13.970 MP

  U.S.: 1.00 USD x 1.024 = 1.024 USD

- Spot rate in one year:

  13.979 MP ÷ 1.024 USD = 13.65 MP

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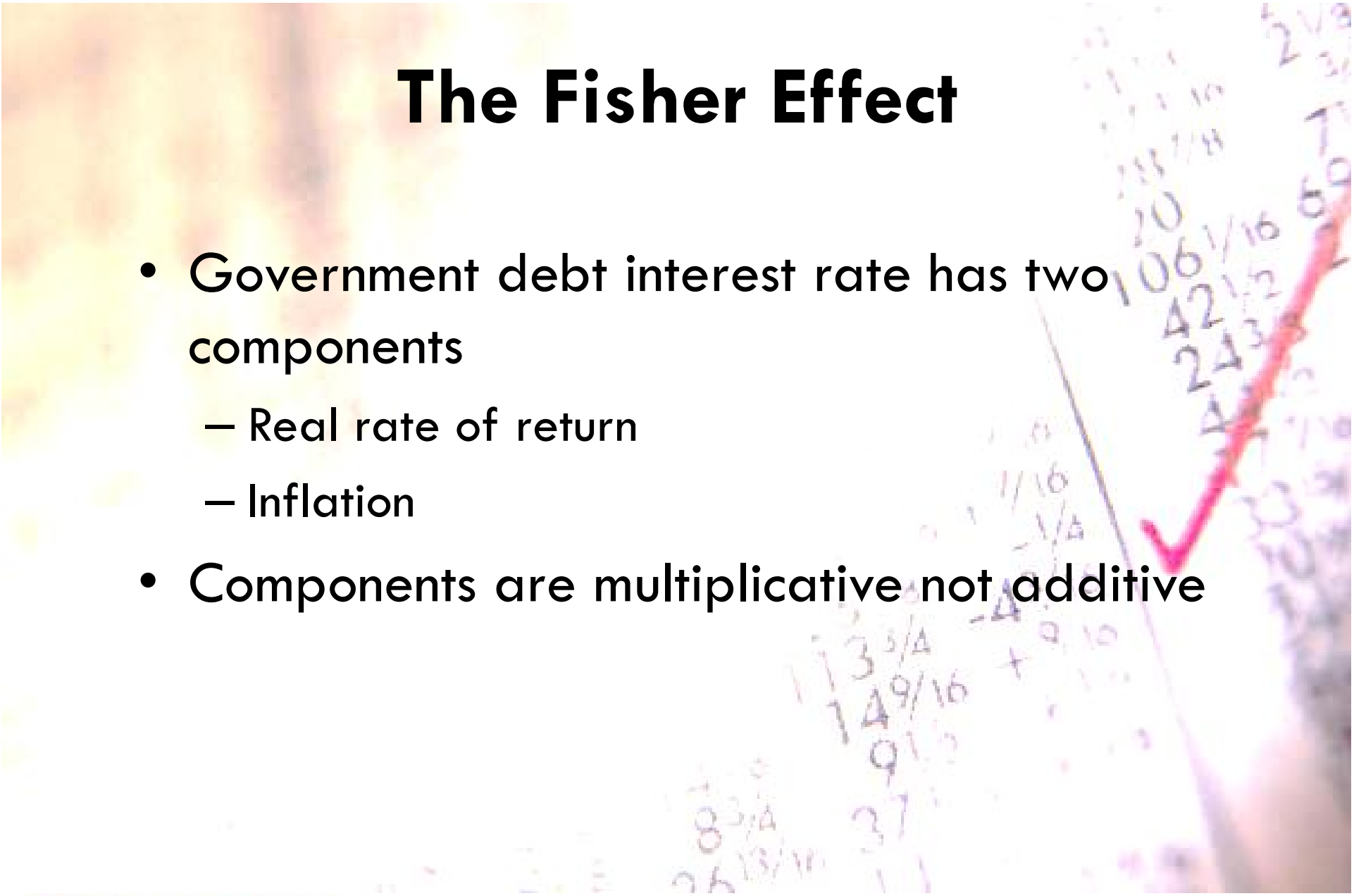
The Fisher Effect

- Government debt interest rate has two components
  - Real rate of return
  - Inflation
- Components are multiplicative not additive



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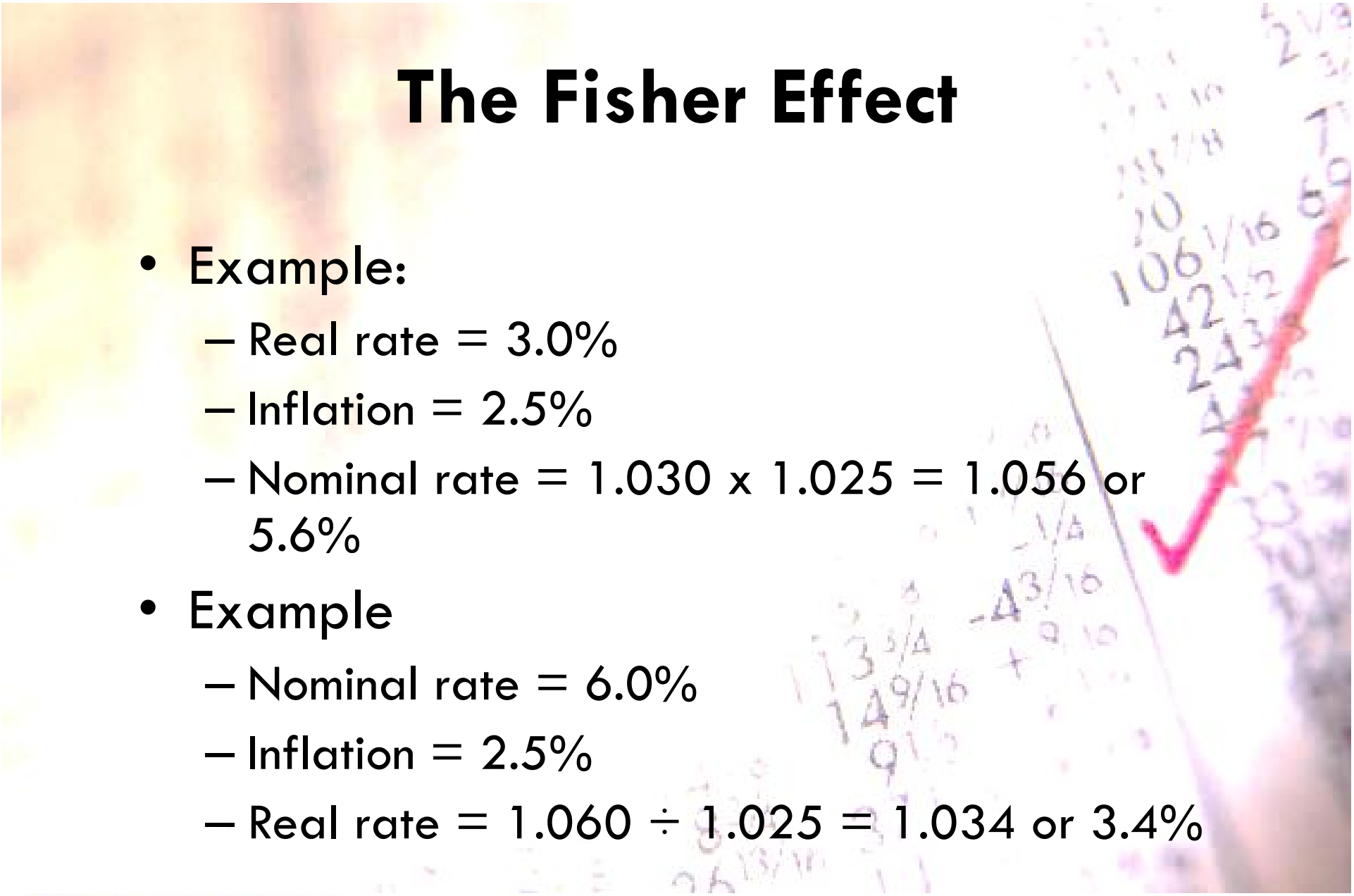
The Fisher Effect

- Example:
  - Real rate = 3.0%
  - Inflation = 2.5%
  - Nominal rate = 1.030 x 1.025 = 1.056 or 5.6%
- Example
  - Nominal rate = 6.0%
  - Inflation = 2.5%
  - Real rate = 1.060 ÷ 1.025 = 1.034 or 3.4%



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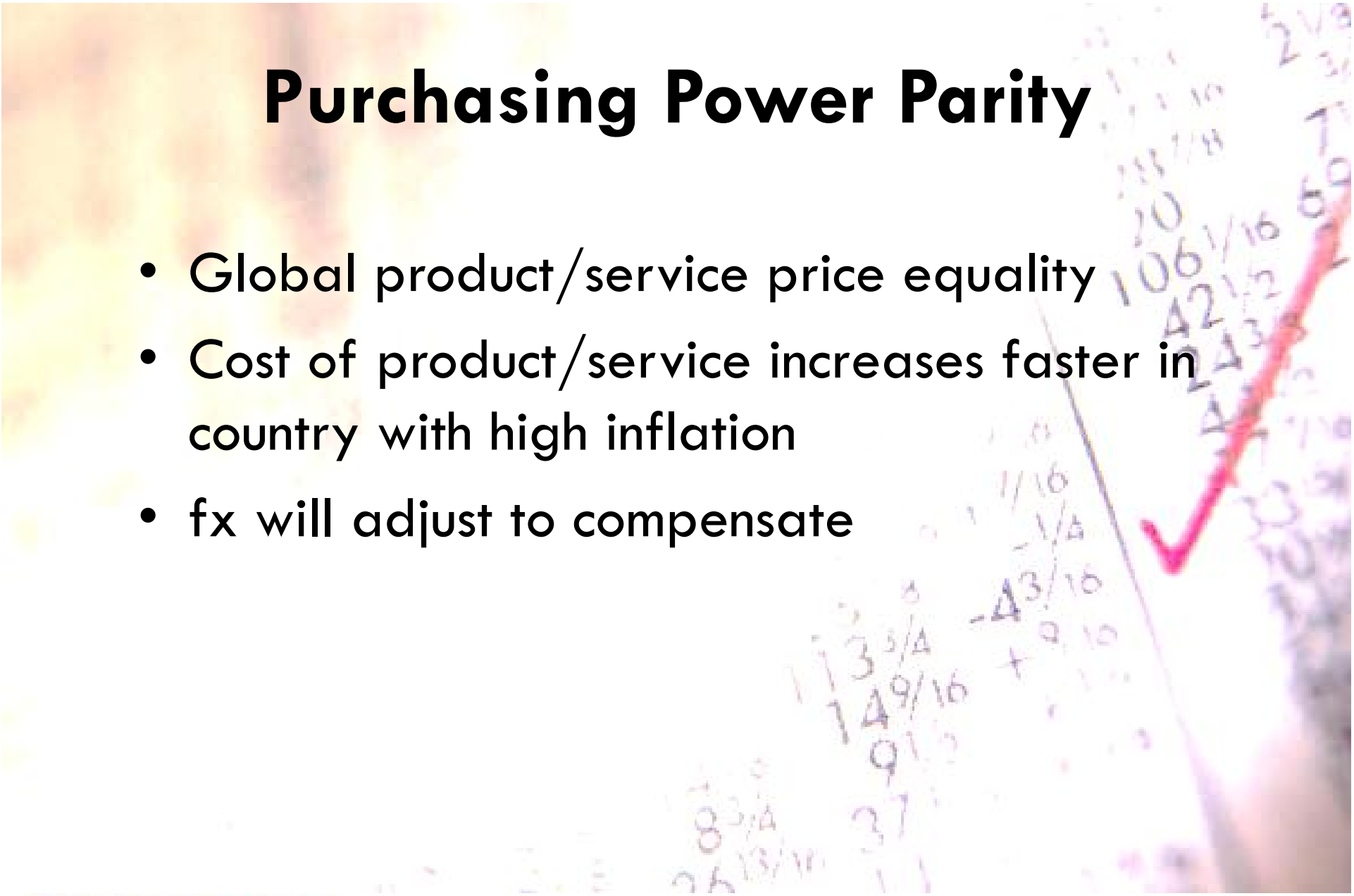
The International Fisher Effect

- Real rate of interest is based on demand and supply of capital
- In optimal, completely efficient global market, there would be a single real rate of interest
- Therefore, difference in nominal interest rates must reflect difference in inflation rate
- Currency in country with high inflation will devalue against currency in country with low inflation

Purchasing Power Parity

- Global product/service price equality
- Cost of product/service increases faster in country with high inflation
- fx will adjust to compensate



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Purchasing Power Parity

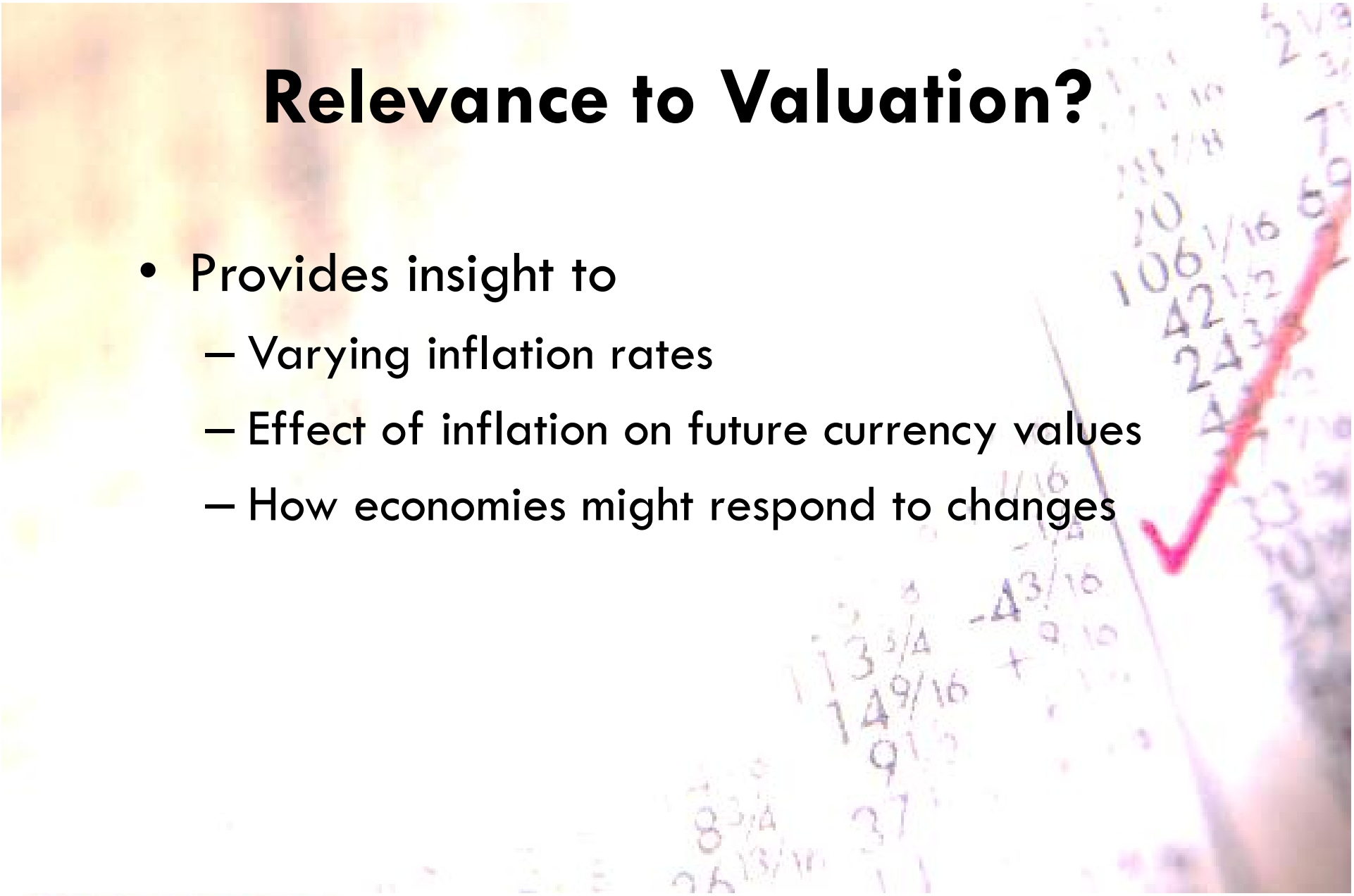
- Example:
  - iPhone 5 costs 500 USD or 6,600 MP (13.20 fx)
  - U.S. inflation = 2.5%; Mexican inflation = 4.0%
  - 1 year later, iPhone 5 costs 6,864 MP (6,600 x 1.04)
  - However, fx changes to 13.41:

    6,864 MP ÷ (500 x 1.025) = 13.41 MP/USD
  - Phone cost in USD inflated only 2.5%:

    6,864 MP ÷ 13.41 MP/USD = 512.50 USD

Relevance to Valuation?

- Provides insight to
  - Varying inflation rates
  - Effect of inflation on future currency values
  - How economies might respond to changes



Relevance to Valuation?

- Example:
  - Fair market value = 3.30 million Mexican Pesos
  - At 13.20 fx, fair market value = 0.25 million USD
- Has the currency exchange risk been properly addressed?
- It depends on the discount rate used

Perspective of Valuation

- In what currency will the valuation be expressed?
- From what country(ies) does the SuCo generate cash flow?
- **<u>The currency of the cash flows must correlate with the currency of the discount rate</u>**

Perspective of Valuation

- SuCo operates in a developed economy (e.g., U.S.); client wants valuation expressed in Euros
  - Cash flows in Euros
  - Discount rate based on German economic and market variables (Rf_G, ERP_G, β_G)

Perspective of Valuation

- SuCo operates in a developing economy (e.g., Poland); but client wants valuation expressed in Euros
  - Cash flows in Euros
  - Discount rate based on German economic and market variables (Rf_G, ERP_G, β_G)
  - Additional adjustment for country risk and for currency exchange risk between the Euro and the Zloty

Perspective of Valuation

- SuCo operates in Poland and wants valuation expressed in Zloty
  - Cash flows in Zloty
  - Discount rate based on Polish economic metrics
  - With no developed market, Polish economic metrics must be based on developed economy and adjusted for Polish economic metrics
  - ERP_P & $ß_P$ are functions of ERP_G & $ß_G$

Adjustment for Currency Risk

- Currency risk = inflation and fx volatility

$$K_L = \left\{ [1 + K_{DE}] \left(\frac{(1 + \text{Inflation}_L)}{(1 + \text{Inflation}_{DE})} \right) \right\} - 1$$

Where:

K_L =	Discount rate for local equity capital
K_{DE} =	Discount rate for equity capital in a developed economy
Inflation_L =	Inflation rate in local country
Inflation_{DE} =	Inflation rate in the developed economy

Adjustment for Currency Risk

- Example:
  - 15.0% k_e derived from U.S. economy
  - 2.5% U.S. inflation rate
  - 4.0% Mexican inflation rate
  - k_e to be used with cash flows in Pesos

$$k_e \text{ (Mexico)} = \{[1+0.15] \times [(1+.040) \div (1+.025)]\} - 1$$
$$= 16.7\%$$

Analysis of Country Risk

- Country risk
  - Political
  - Economic
  - Financial

Country Political Risk

- Changes in political leadership
- External conflicts
- Government corruption
- Role of military
- Role of organized religion
- Expropriation of private investment
- Existence of middle class

Country Political Risk

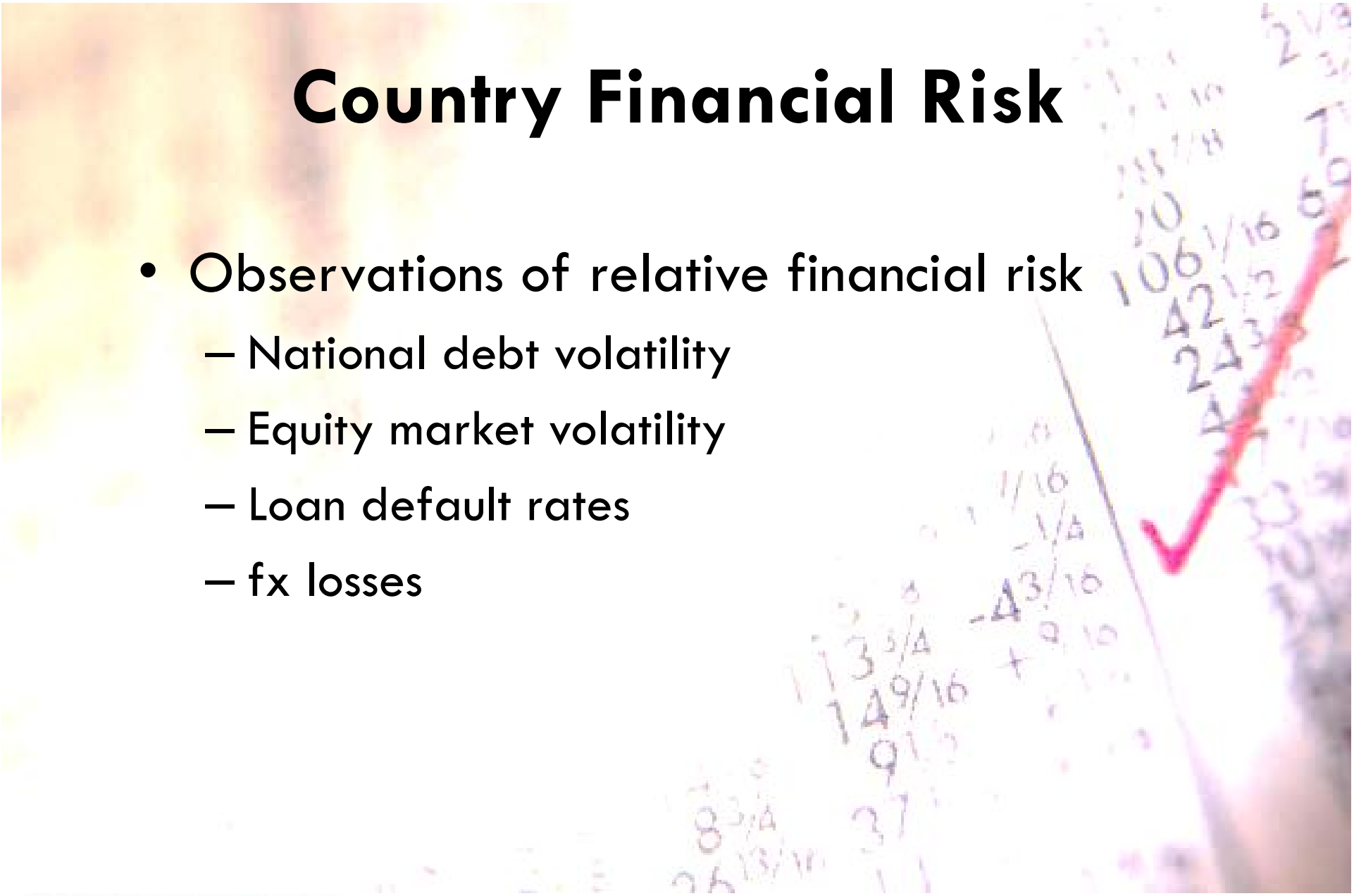
- Subjective assessment
- PRS Group (www.PRSGroup.com)
  - "Political Risk Services Model" for assessing and forecasting political and country risk
  - "International Country Risk Guide" – ratings of countries by risk
  - Very expensive

Country Economic Risk

- Observations of relative economic risk
  - Inflation
  - Sovereign debt % of GDP
  - Real GDP growth
  - Exchange rate
  - Net export/import balance
  - Current account balance

Country Financial Risk

- Observations of relative financial risk
  - National debt volatility
  - Equity market volatility
  - Loan default rates
  - fx losses



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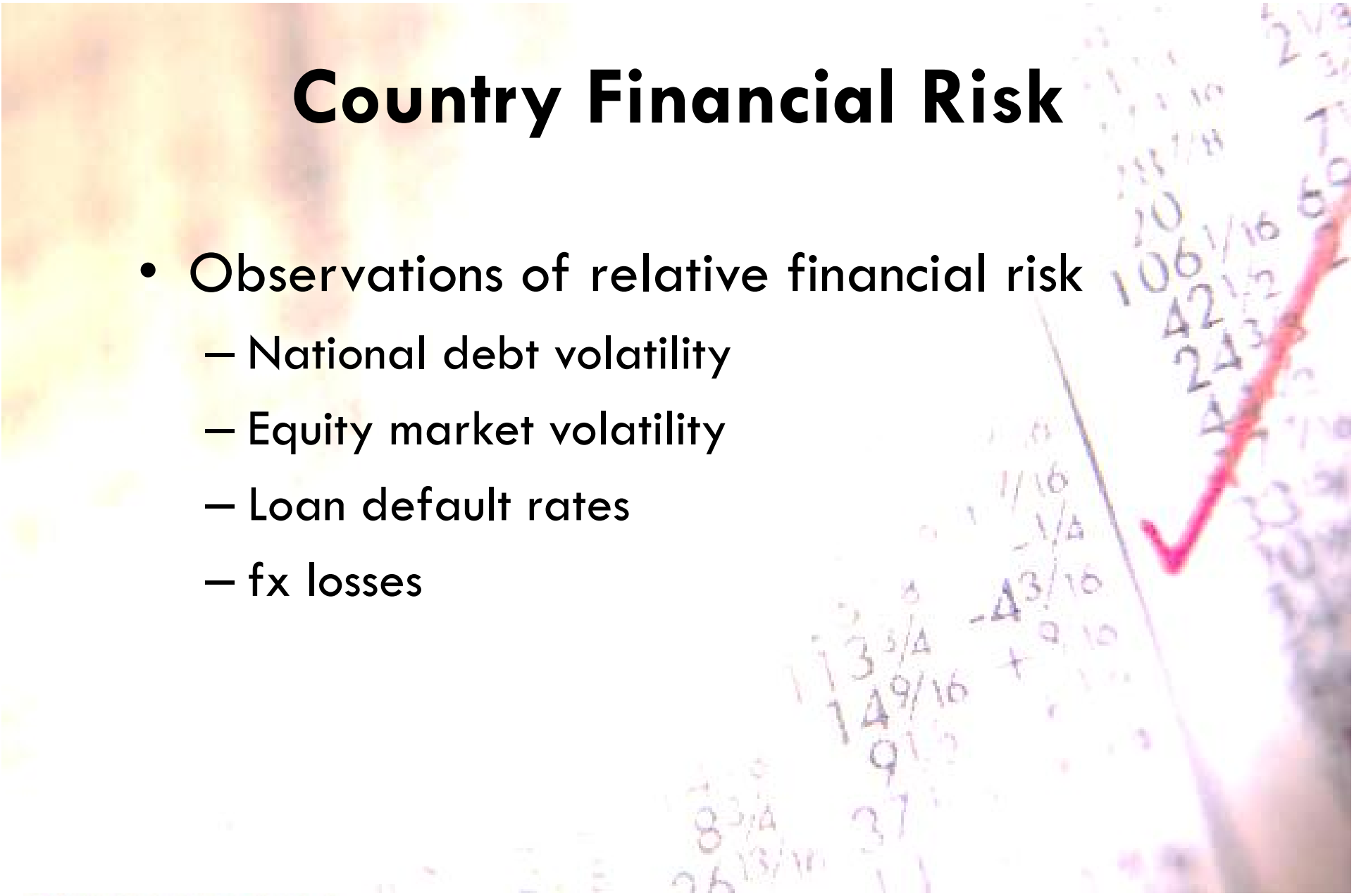


Measuring Country Risk

- Country bond default spreads
  - Sovereign debt yield from undeveloped economy minus that of developed economy
    - U.S. denominated bond yield in Mexico = 4.1%
    - U.S. treasury yield = 2.4%
    - Mexico country risk premium = 1.7%
    - Does not address volatility of equity market
    - Possible high volatility of yields in Mexico

Measuring Country Risk

- Relative equity market volatility

  ERPx = ERPz * RSDx

  Where:

  ERPx = ERP in Country X

  ERPz = ERP in developed Country Z

  RSDx = Relative Standard Deviation of Country X equity market to Country Z equity market

Measuring Country Risk

- Example

  Std Dev of Mexican market = 2.05%

  Std Dev of U.S. market = 1.75%

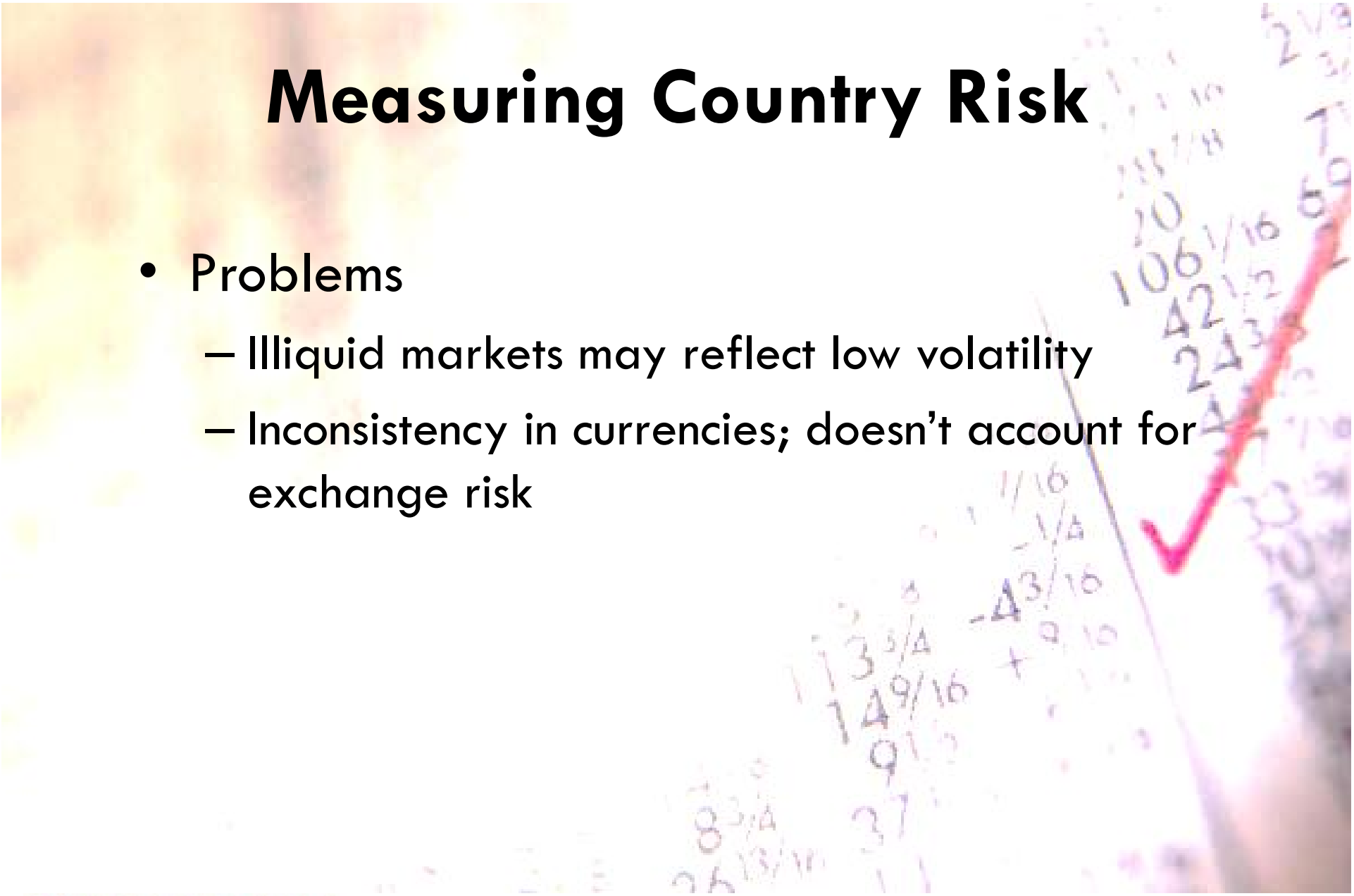
  RSD_{Mex} = 2.05% ÷ 1.75% = 1.17x

  ERP_{US} = 5.0%

  ERP_{Mex} = 5.0% x 1.17 = 5.9%

Measuring Country Risk

- Problems
  - Illiquid markets may reflect low volatility
  - Inconsistency in currencies; doesn't account for exchange risk



Measuring Country Risk

- Default Spread + Relative Standard Deviation
  - Combines the measure of risk of default with volatility of equity market

$$ERP_{Mex} = ERP_{US} + [CDS_{Mex} * (Ó_E \div Ó_B)]$$

Where:

ERP_{US} = ERP in U.S.

CDS_{Mex} = Mexico country default spread

$Ó_E$ = Std dev of Mexican equity market

$Ó_B$ = Std dev of Mexican gov't bond market

Measuring Country Risk

- Example:
  - ERP_{US} = 5.0%
  - CDS_{Mex} = 1.7%
  - $STDEV_E$ = 2.05%
  - $STDEV_B$ = 3.02%

$$ERPMex = 5.0\% + [1.7\% * (2.05\% \div 3.02\%)]$$
$$= 6.2\%$$

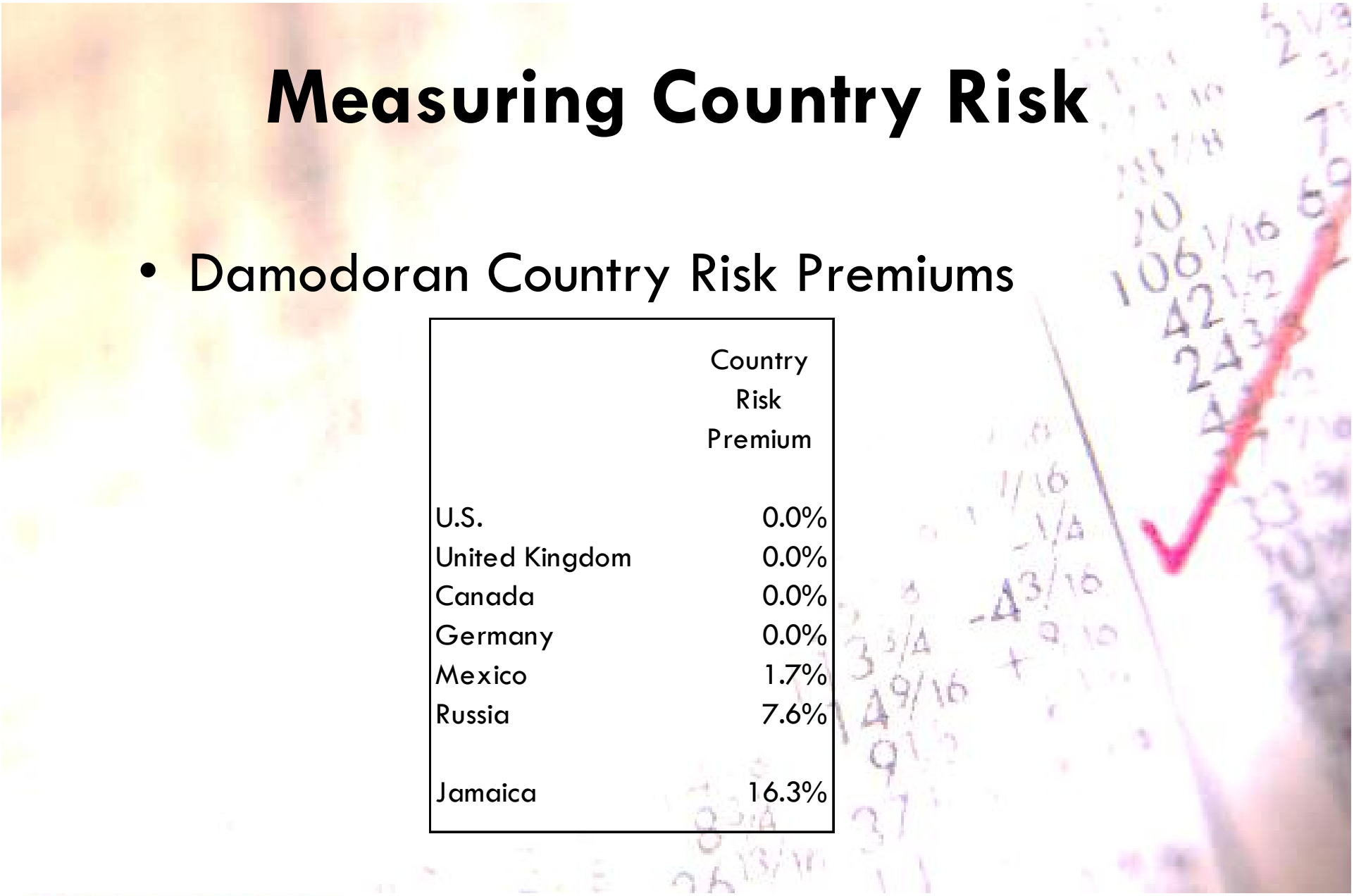
Measuring Country Risk

- Damodoran Country Risk Premiums
  - Uses variations of the default spread and relative volatility methods
  - Updated annually
  - http://www.stern.nyu.edu/~adamodar/pc/datasets/ctryprem.xls

Measuring Country Risk

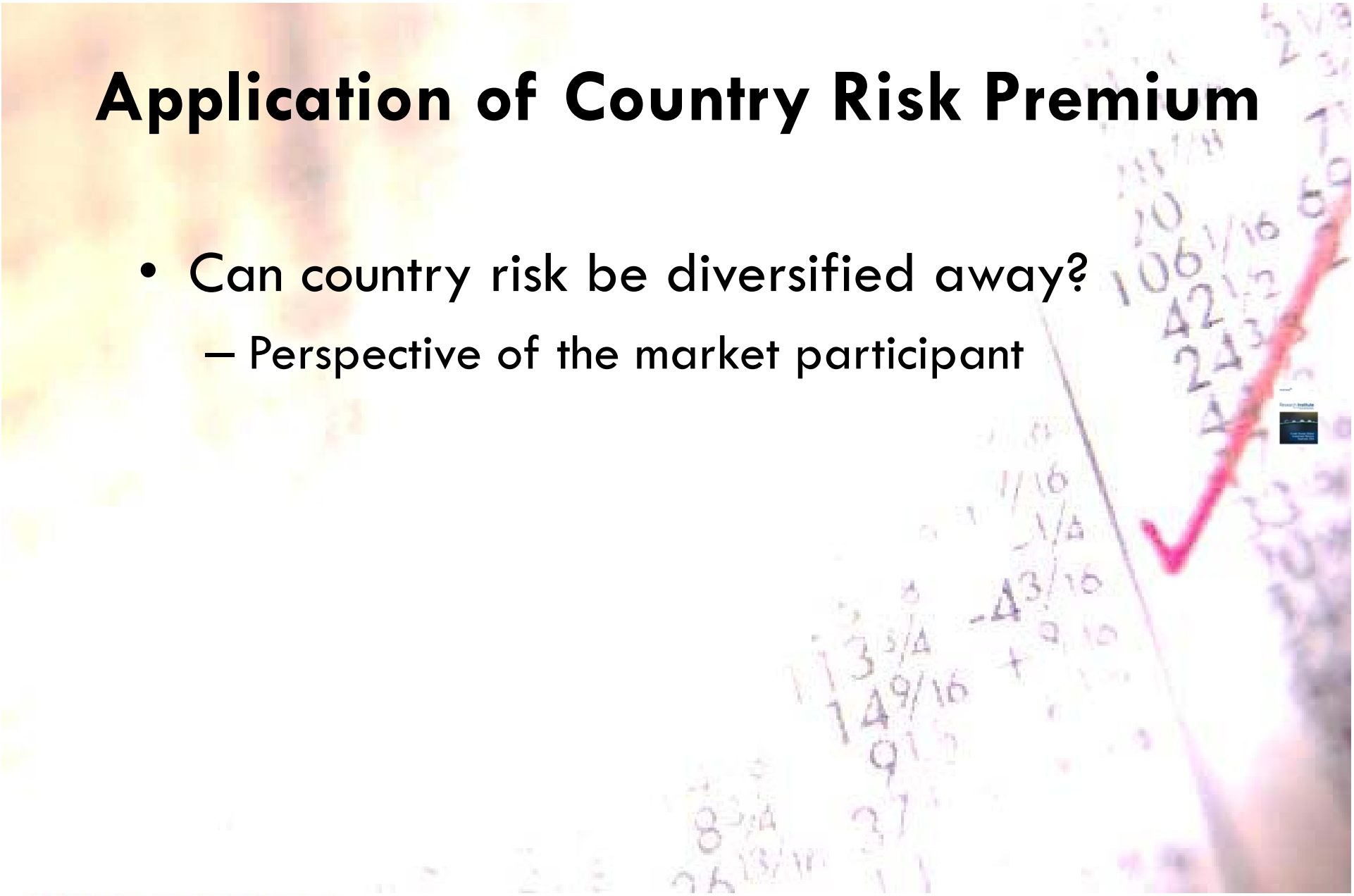
- Damodoran Country Risk Premiums

	Country Risk Premium
U.S.	0.0%
United Kingdom	0.0%
Canada	0.0%
Germany	0.0%
Mexico	1.7%
Russia	7.6%
Jamaica	16.3%



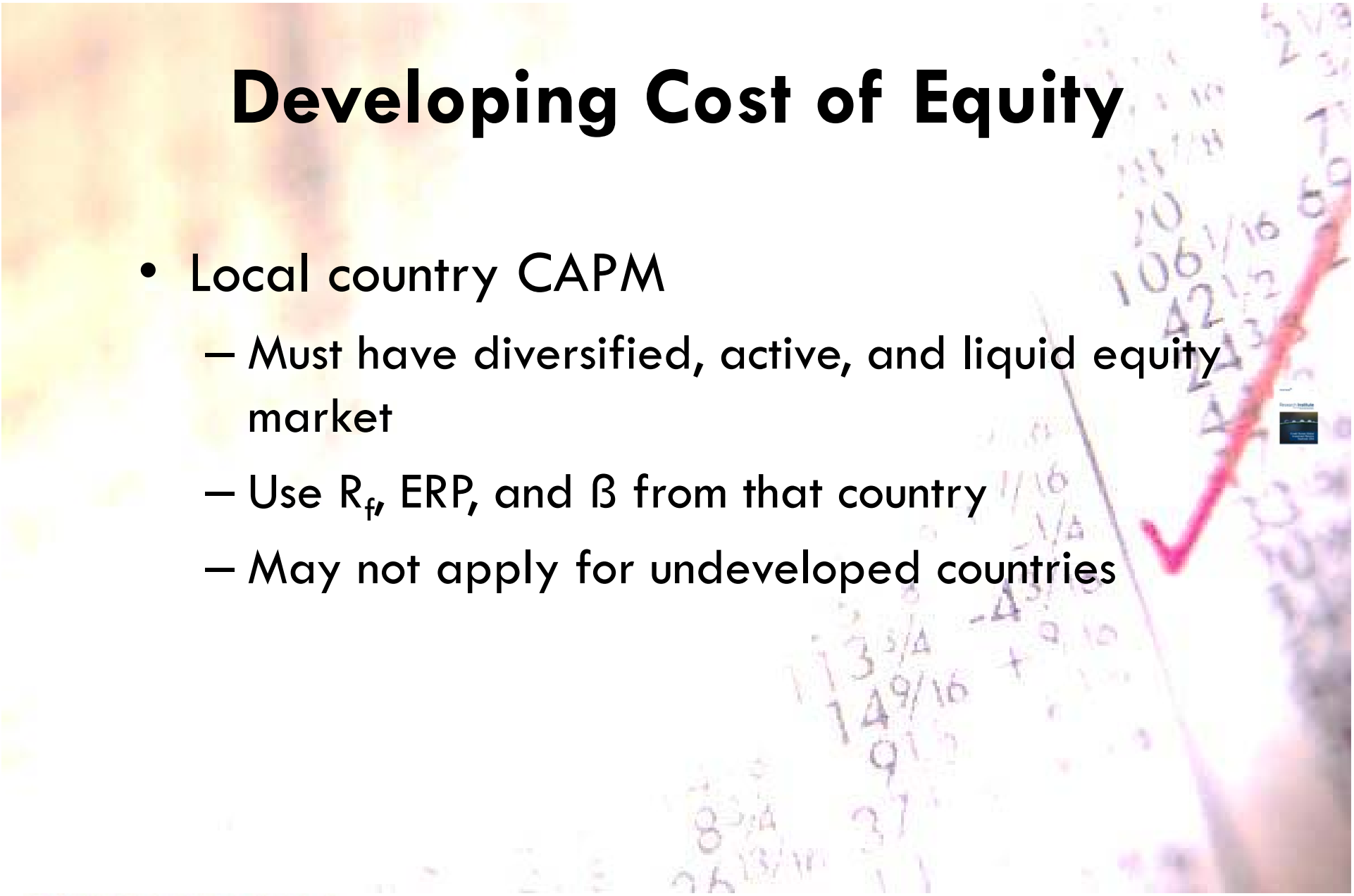
Application of Country Risk Premium

- Can country risk be diversified away?
  - Perspective of the market participant



Developing Cost of Equity

- Local country CAPM
  - Must have diversified, active, and liquid equity market
  - Use R_f, ERP, and ß from that country
  - May not apply for undeveloped countries



Developing Cost of Equity

- International CAPM Method

$$k_L = R_{f\text{-}L} + \beta_{SC} * (ERP_W) + alpha$$

Where:

k_L	=	Cost of equity of local company
$R_{f\text{-}L}$	=	Local government bond yield
β_{SC}	=	SuCo beta in Mexican market
ERP_W	=	ERP of world = $ERP_{DE} \div \beta_{DE}$
ERP_{DE}	=	ERP of developed economy (e.g., U.S.)
β_{DE}	=	Beta of developed economy to world

Developing Cost of Equity

- Country (Default) Spread Method

$$k_L = R_{f\text{-}US} + CDS + \beta_{US} * (ERP_{US}) + alpha$$

Where:

k_L	=	Cost of equity of local company
$R_{f\text{-}US}$	=	U.S. Treasury yield
CDS	=	Country default spread: difference between yield of $-denominated local government bonds and $R_{f\text{-}US}$
β_{US}	=	SuCo beta in US market
ERP_{US}	=	ERP of US Market

Developing Cost of Equity

- Relative Standard Deviation Model

$$k_L = R_{f\text{-}US} + [(Ó_L \div Ó_{US}) * (ERP_{US})] + \text{alpha}$$

Where:

k_L	=	Cost of equity of Mexican company
$R_{f\text{-}US}$	=	U.S. Treasury yield
$Ó_L$	=	Standard deviation of equity returns in local equity market
$Ó_{US}$	=	Standard deviation of equity returns in US equity market
ERP_{US}	=	ERP of US Market

Developing Cost of Equity

- Damodoran Model

$$k_L = R_{f\text{-}US} + (\beta_{US} * ERP_{US}) + \lambda(CRP)$$

Where:

k_L	=	Cost of equity of Mexican company
$R_{f\text{-}US}$	=	U.S. Treasury yield
β_{US}	=	Beta of company in U.S. equity market
ERP_{US}	=	ERP of US Market
λ	=	Exposure to local country risk
CRP	=	Country risk premium

Resources

- Political risk data sources
  - Country Forecasts by Political Risk Services
    - http://www.prsgroup.com
  - Institutional Investor
    - http://www.institutionalinvestor.com
  - Standard and Poor's
    - http://www.StandardAndPoors.com
  - Moody's Investors Services
    - http://www.Moodys.com

Resources

- International Cost of Capital
  - Credit Suisse: https://publications.**credit-suisse**.com
  - NYU Professor Aswath Damodaran: http://pages.stern.nyu.edu/~adamodar/
- Interest Rate Data
  - *The Economist:* http://www.Economist.com
  - *Financial Times* (International Capital Markets): http://markets.ft.com/RESEARCH/Markets/Interest-Rates

QUESTIONS?

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