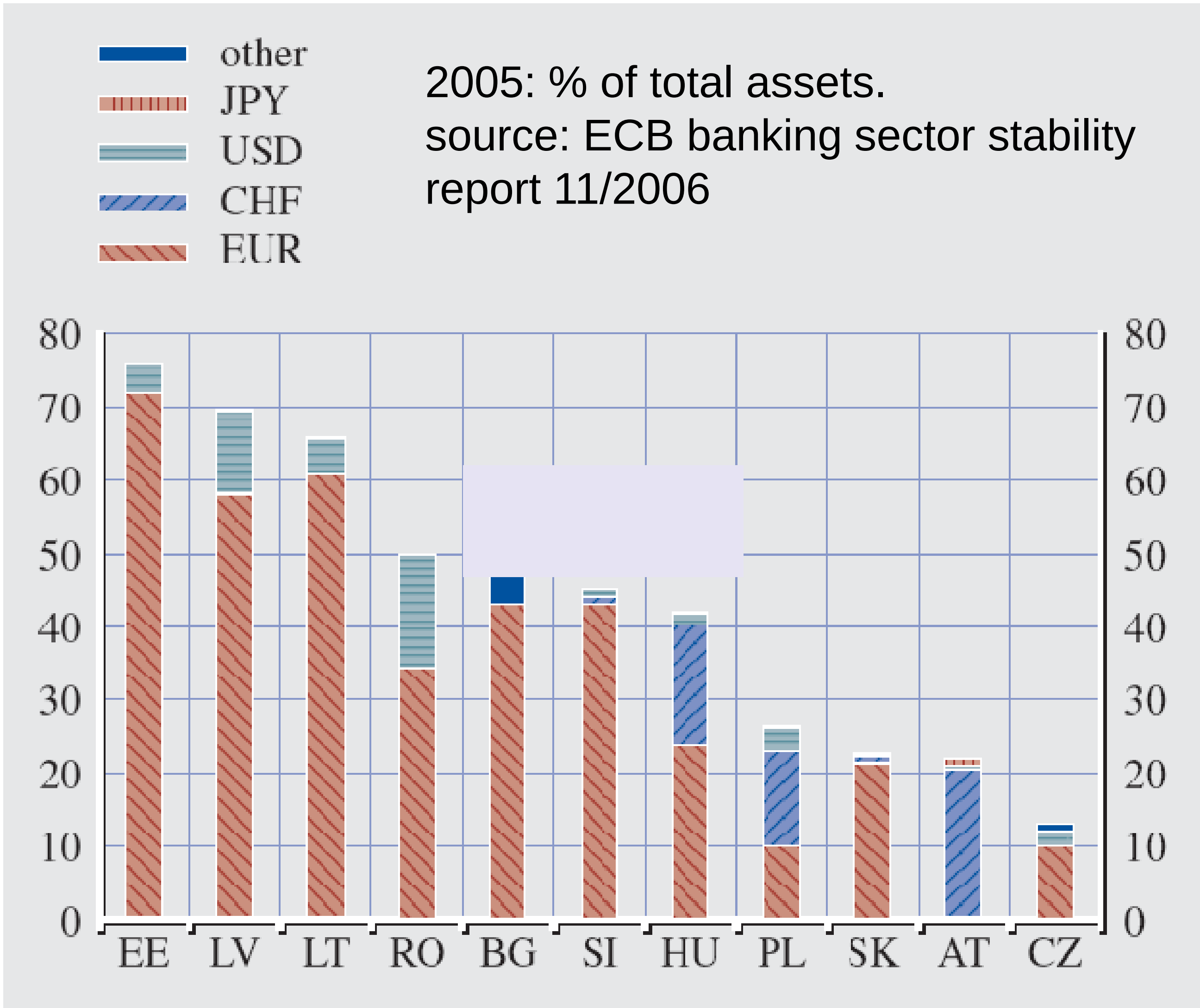
Foreign Currency Borrowing by Small Firms

Martin Brown, *Swiss National Bank*

Steven Ongena, *CentER – Tilburg University & CEPR*

Pinar Yesin, *Swiss National Bank*

Foreign currency bank assets in Europe



Motivation

"Corporate foreign currency debt in (emerging) Europe is at levels similar to pre-crisis Asia and Latin America

… currency risks are amplified because much of the corporate foreign currency exposure seems unhedged"

IMF 2007

Sorsa, Bakker, Duenwald, Maechler and Tiffin

Motivation (2)

"The drive of (foreign) banks to complement limited earnings opportunities at home with high profits from emerging Europe may have led to risk under-pricing ….

….. this under-pricing may be compounded by limited data on creditworthiness and weak institutions"

IMF 2007

Sorsa, Bakker, Duenwald, Maechler and Tiffin

Contribution of this paper

1. Theoretical: implications of information asymmetries for foreign currency borrowing

2. Empirical: determinants of foreign currency borrowing by small firms in Eastern Europe
   – information problems are stronger for small firms

Foreign currency borrowing by firms: theory

- Credit cost vs. credit risk
  - foreign currency earnings of firm (+)
  - interest rate differential (+)
  - exchange rate volatility (-)
  - firm distress costs (-)

(Allayanis, Brown & Klapper, *JF* 2003)

(Cowen, *BChile* 2006)

- Information asymmetry on currency of income
  - local curr. earners don't bear full risk premium of forex loan

$\Rightarrow$ increase in forex borrowing by local currency earners

Foreign currency borrowing by firms: evidence

- Forex borrowing by large firms
  - interest differential (+)
  - exchange rate volatility (-)
  - foreign currency income (+)

Kedia & Mozumdar, *JB* 2003	USA
Allayanis, Brown & Klapper, *JF* 2003	East Asia
Keloharju & Niskannen, *EFM* 2001	Finland
Cowan, *BChile* 2006	South America

…. we look at small firms in Eastern Europe & CIS

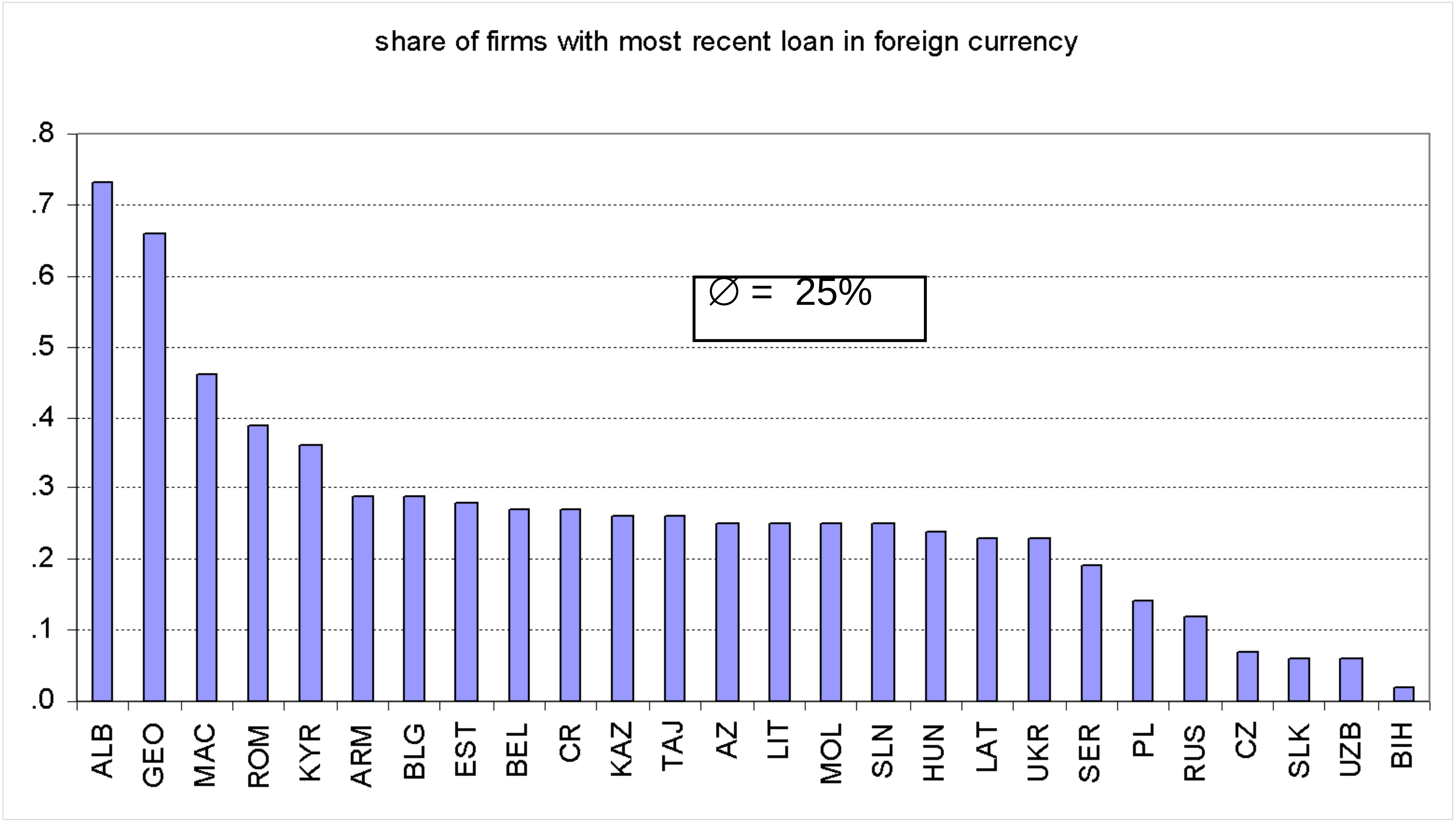
Data: firm-level loan choice

- World Bank / EBRD survey (BEEPS)
  - representative survey for 26 transition countries
  - 2005 Survey: 9’655 firms

- Information on most recent loan
  - 3’105 observations from 26 countries
  - date of disbursement (2002:I -2005:II)
  - duration, collateral, interest rate
  - currency denomination

Forex loan (yes / no)

Forex borrowing by country



Empirical methodology

- Firm-level determinants
  - revenue currency, distress costs, financial transparency
  - country-time fixed effects
- Country-level determinants
  - interest rates, monetary volatility, bank ownership, corporate governance
- Probit regressions
  - full sample analysis
  - split sample by firm revenue & country dollarization

    … look at local currency earners only

Firm-level explanatory variables (BEEPS)

- Foreign currency income
  - exporter, sales to multinationals, foreign owner

- Distress costs
  - debt, family firm, security costs,

- Financial transparency
  - audited firm, income via bank

- Others:
  - international accounting, small firm, age
  - industry / country-time fixed effects

Firm-level determinants: summary statistics

	Currency of latest loan		
	Foreign	Local	T- Test
Exporter (+)	43%	31%	***
Sales to multis (+)	24%	17%	***
Foreign firm (+)	20%	8%	***
Debt (-)	40%	38%	
Family firm (-)	70%	73%	
Security costs (+)	0.93%	0.69%	***
Audit (-)	59%	51%	***
Income via bank (-)	55%	58%	*

***, **, * significant at 1%, 5%, 10% level

Firm-level determinants: regression results

- Foreign currency income : strong effects
  - *Exporter, Sales to multis, Foreign owner* raise prob. of forex loan
- Distress costs: weak effects
  - no impact of *family firm, debt* on currency of loan
  - *Security costs* increase prob. of forex loan

    …. but only signficant for foreign currency earners
- Financial transparency: mixed effects
  - no impact of *income via bank*
  - significant negative effect of *audit* for local currency compared to forex earners

Firm-level regression results

	full sample	sample split	
		Non-forex firms	Forex firms
Exporter (+)	.081***		
Sales to multis (+)	.056*		
Foreign firm (+)	.201***		
Debt (-)	.017	.012	.021
Family firm (-)	.028	.029	-.011
Security costs (+)	.010***	.010	.011*
Audited firm (-)	.010	-.029	.046
Income via bank (-)	-.010	-.031	.015
Observations	2,946	904	1,885
Methodology:	Probit, standard errors adjusted for clustering		
Firm controls:	Firm accounts, size & age; Loan duration & collateral		
Country controls:	country fixed effects		

Country-level explanatory variables

• Interest rate differentials	Basso et al. 2007 / IMF
• Monetary volatility	
– exchange rate regime / volatility	IMF
– inflation volatility	IMF
• Financial sector	
– foreign bank presence	EBRD / Basso et al. 2007
• Corporate governance	
– enterprise reform	EBRD
• Controls:	
– dollarization	Basso et al. 2007
– political affiliation	

Country-level variables: summary statistics

	Currency of latest loan		
	Foreign	Local	T- Test
Interest diff. (+)	6.4%	5.3%	***
Exrate volatility (-)	5.83	5.83	
Foreign banks (+)	53.9 %	54.9%	
Enterprise reform (-)	2.4	2.6	***

***, **, * significant at 1%, 5%, 10% level

Country-level determinants: regression results

- Interest rate differentials: strong cross country effects
  - interest differential increases forex borrowing

    .... but effect is insignificant in regressions with country-effects

- Exchange rate volatility: mixed effects
  - volatility increases forex borrowing

    … but decreases forex borowing by local currency earners

- Financial sector / corporate governance: weak effects
  - *Foreign banks* increase forex borrowing

    .... but for all firms
  - *Enterprise reform* decreases forex borrowing

    …. but only significant for foreign currency earners

Country-level regression results

	full sample		sample split	
			non-forex firms	forex firms
	no effects	country effects	no effects	no effects
Interest rate diff (+)	.012***	.011	.004	.014***
Foreign banks (+)	.002*	.002	.001*	.001*
Enterprise reform (-)	-.177***	-.324**	-.051	-.179**
Dollarization (+)	.179	.029	.065	.257
Exrate volatility-Euro (-)	.001	.007**	-.006	.003
Inflation volatility (+)	.011	.024	.073	.006
Observations	1,972	1,972	651	1,319
Methodology:	Probit, stand. errors adjusted for clustering			
Firm controls:	Income currency, Distress costs, Transparency, Loan terms			

Summary & conclusion

- Forex borrowing is encouraged by
  - foreign currency income of firms
  - persistent interest rate differentials

- Forex borrowing is not driven by
  - information asymmetries between lenders and borrowers
  - short-term changes in interest rate differentials

Forex borrowing by small firms in Eastern Europe does <u>not</u> seem to be driven by speculation nor aggravated by weak information of lenders !

xtra slides

Minimum portfolio variance

- Theory variance (Ize & Yeyati, *JIE* 2003)
  - inflation volatility (+)
  - real exchange rate volatility (-)

- Evidence: aggregate “dollarization” of loans
  - interest rate differential (+)
  - inflation volatility (+)
  - exchange rate volatility (-)

    (Basso, Calvo-Gonzalez & Jurgilas, *ECB* 2007)

Model – schedule of events

1. Banks offer loans to firms
   - local currency: funding costs i_l
   - foreign currency: funding costs i_f

2. Firms make investment in local currency $I=1$
   - exchange rate (local / foreign currency) $e_0=1$

3. Nature determines exchange rate e_1
   - $p = .5$: $1 - a$ (appreciation)
   - $1-p = .5$: $1 + a$ (depreciation)

   $\left.\begin{array}{l} \\ \end{array}\right\} \quad e^*_1 = 1$

4. Firms earn certain income
   - local currency earners (L) earn R^L
   - foreign currency earners (F) earn R^F
   - expected earning identical $R^L = R^F \cdot e^*_1 = R^F > I$

Model - key assumptions

- Loan repayment
  - firms are limited liable (no initial wealth)
  - $R^L < 1 + a$
  - $R^F (1 - a) < 1$

  Firms default if they take currency bet and exchange rate moves against them

- Firms
  - incur distress costs C_i of defaulting
  - care about income in local currency

- Banks
  - risk-neutral, perfect price competitors
  - foreign funds are cheaper $i_l \geq i_f = 0$

Results – complete information

- Banks can identify firm type
  - interest rate depends on loan denomination and firm type
  - firms are charged fully for currency induced credit risk

- Borrowing behavior
  - all foreign earners take foreign currency loans
  - local currency earners take foreign currency loans if

$$i_l \geq p \cdot C_i$$

(interest rate advantage $\geq$ expected distress costs)

Results – incomplete information

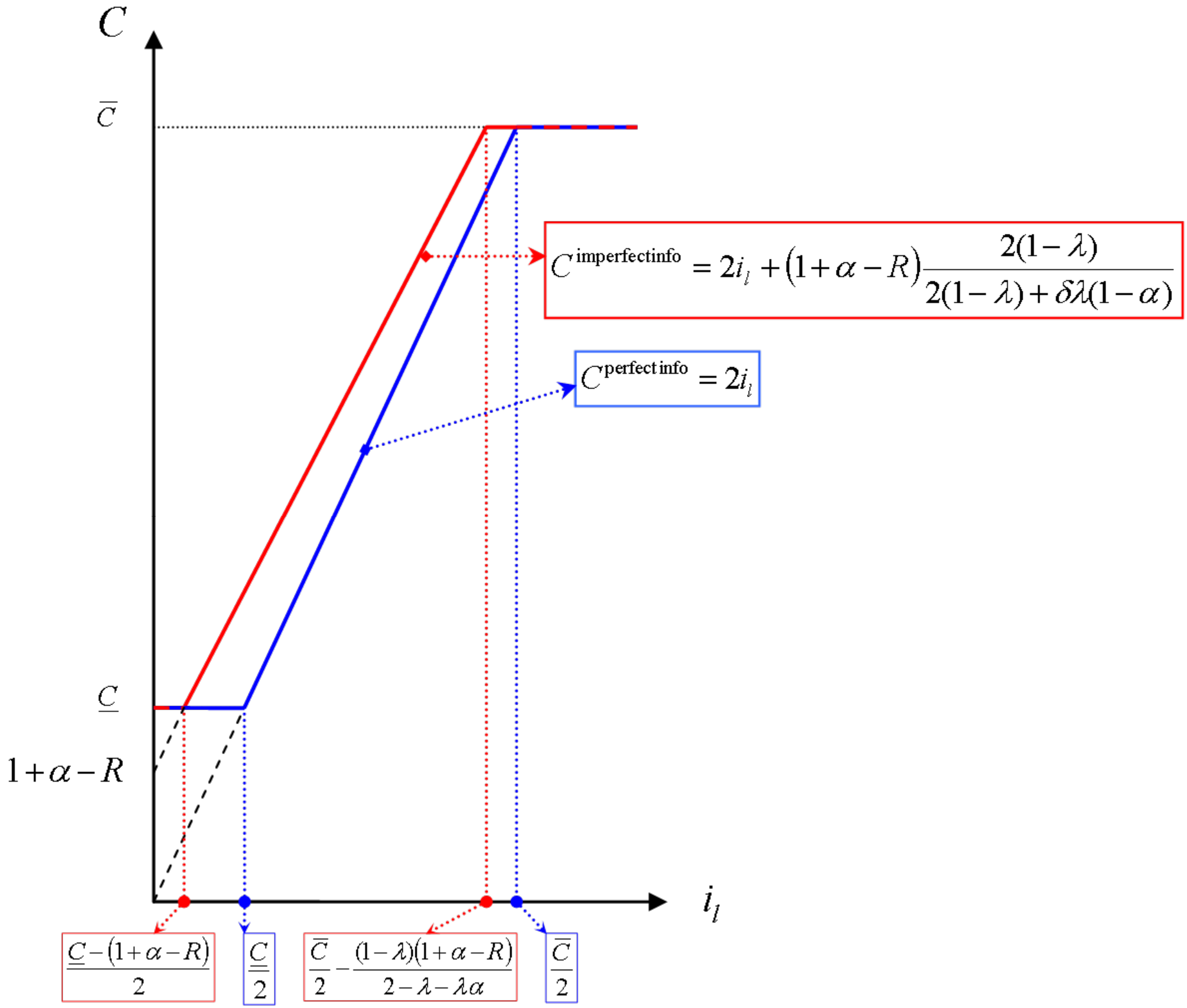
- Banks cannot identify firm type
  - interest rate depends on loan denomination only
  - firms are only charged partly for currency induced credit risk

- Borrowing behavior
  - all foreign earners take foreign currency loans
  - local currency earners take foreign currency loans if

$$i_l \geq p \cdot C_i - \beta$$

(interest rate advantage $\geq$ expected distress costs

– non-charged default cost)



C
$\overline{C}$
$C^{\text{imperfect info}} = 2i_l + (1+\alpha-R)\dfrac{2(1-\lambda)}{2(1-\lambda)+\delta\lambda(1-\alpha)}$
$C^{\text{perfect info}} = 2i_l$
$\underline{C}$
$1+\alpha-R$
i_l
$\dfrac{\underline{C}-(1+\alpha-R)}{2}$
$\dfrac{\underline{C}}{2}$
$\dfrac{\overline{C}}{2}-\dfrac{(1-\lambda)(1+\alpha-R)}{2-\lambda-\lambda\alpha}$
$\dfrac{\overline{C}}{2}$

Countries

- *Weakly dollarized* countries: Albania, Czech Rep., Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Russia, Slovak Rep., Slovenia, and Ukraine.

- *Strongly-dollarized* economies: Armenia, Azerbaijan, Belarus, Bosnia, Bulgaria, Croatia, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Serbia, and Tajikistan.