Country risk premiums: market price or market failure? (*)

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(*) Opinion expressed are personal

Outline

1. Empirical evidence on country risk premiums
2. Country risk premiums and exchange rates
3. Market failure and credit risk premiums (CRP)
4. Is it possible to measure the market failure on CRP for developing countries or put a bound on its value?
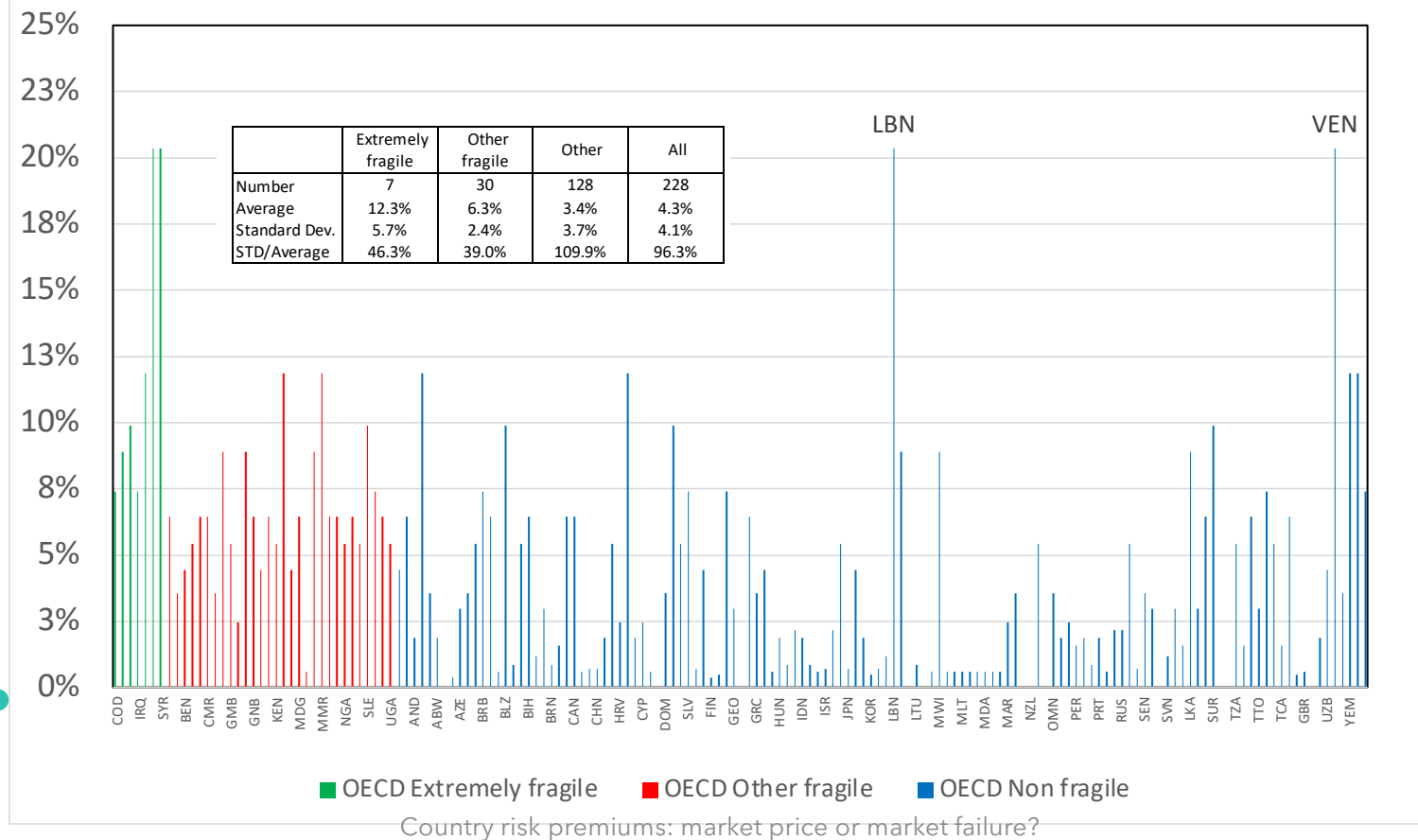
1.Empirical evidence on country risk premiums

Credit default swaps and credit risk premiums

Credit Default Swaps and Credit Risk Premiums
Source: Damodaran (2022)
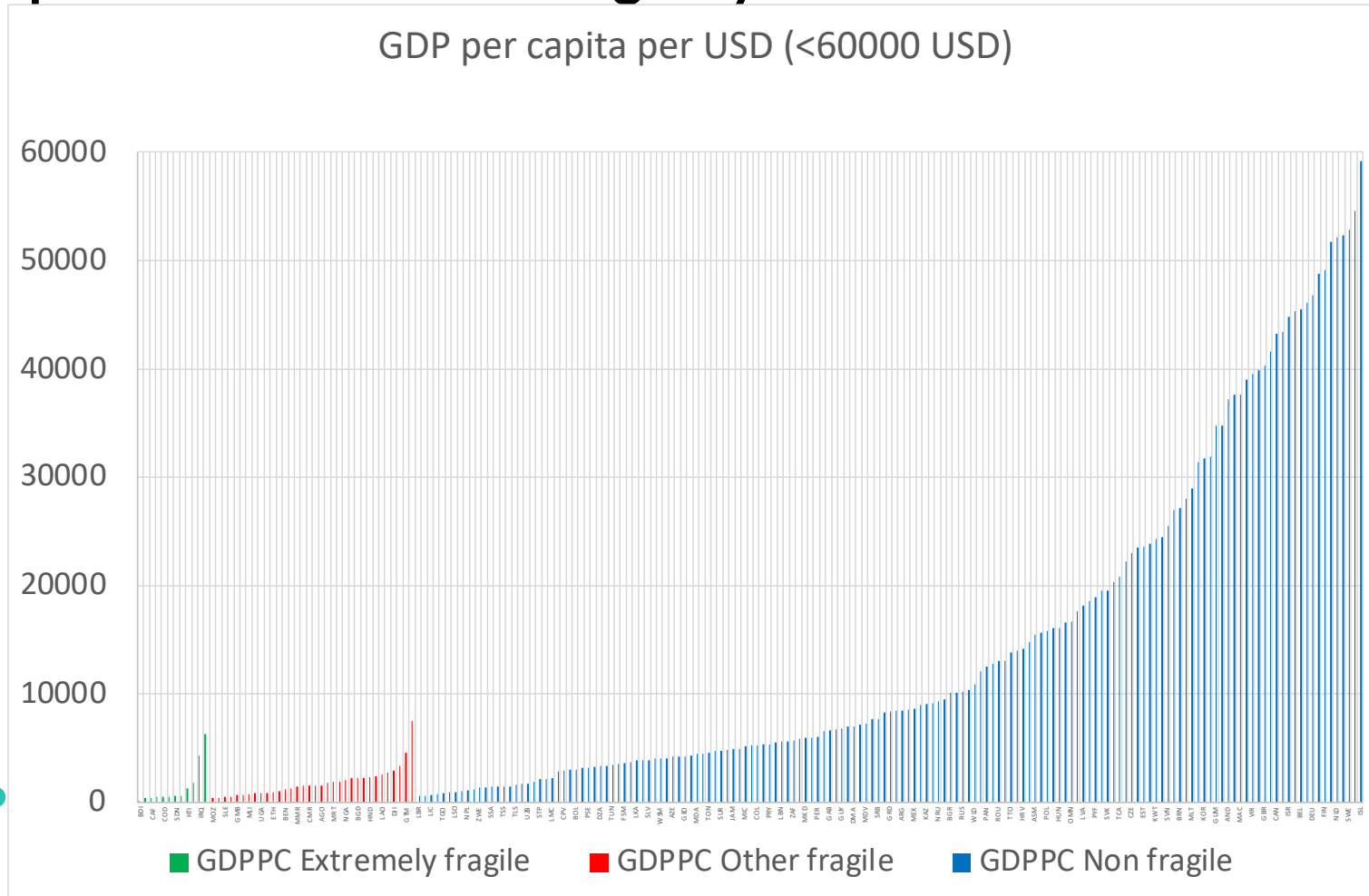
$y = 0.6543x - 0.0048$
$R^2 = 0.355$
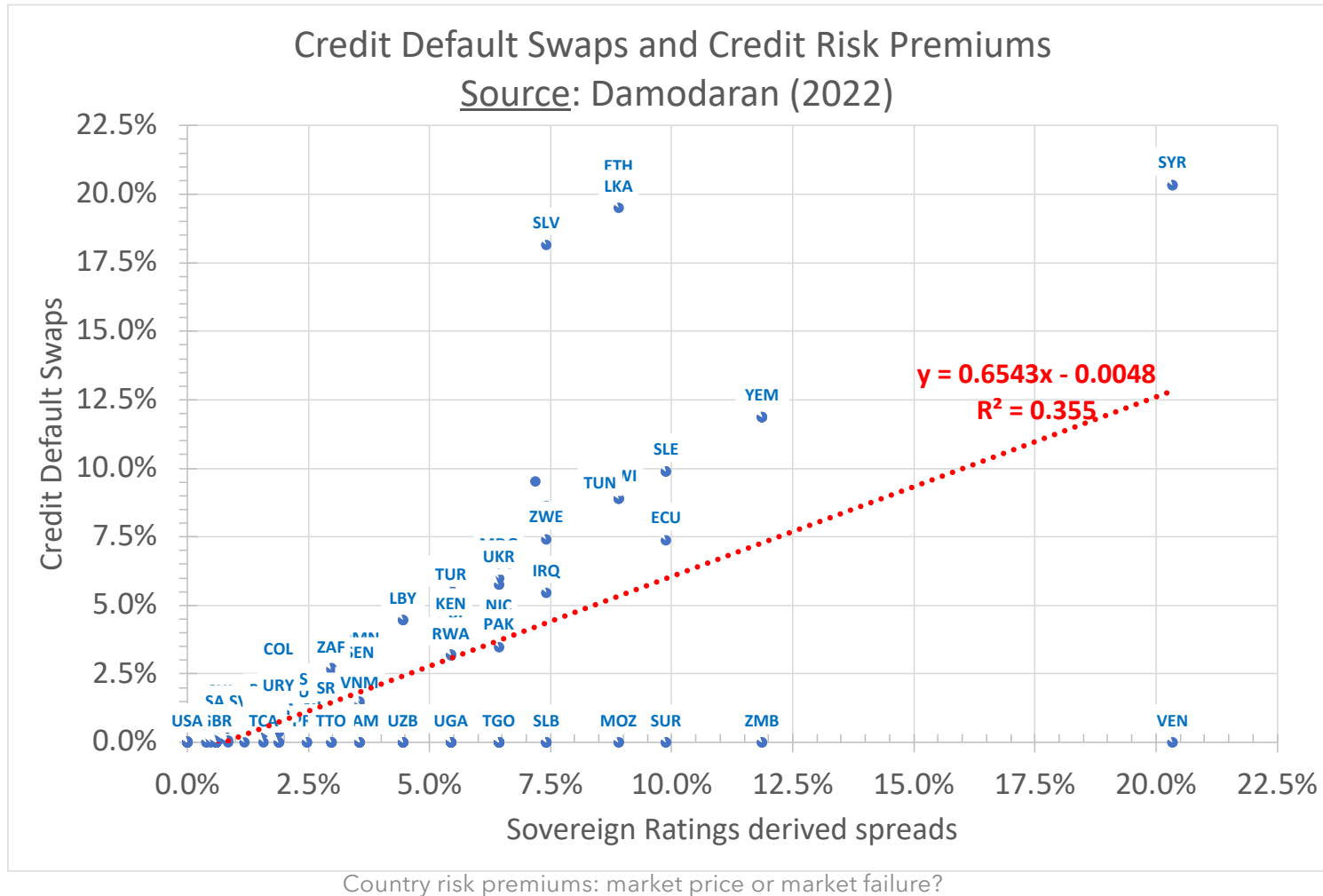
CRP for fragile and non-fragile countries

Credit default spreads based on ratings adjusted for equity volatility
Source: Domodaran (2022) for CRP and OECD (2022) for country groupings

	Extremely fragile	Other fragile	Other	All
Number	7	30	128	228
Average	12.3%	6.3%	3.4%	4.3%
Standard Dev.	5.7%	2.4%	3.7%	4.1%
STD/Average	46.3%	39.0%	109.9%	96.3%

■ OECD Extremely fragile   ■ OECD Other fragile   ■ OECD Non fragile

Country risk premiums: market price or market failure?

GDP per head and fragility

GDP per capita per USD (<60000 USD)

Legend: GDPPC Extremely fragile (green), GDPPC Other fragile (red), GDPPC Non fragile (blue)

Credit risk premiums and GDP per capita
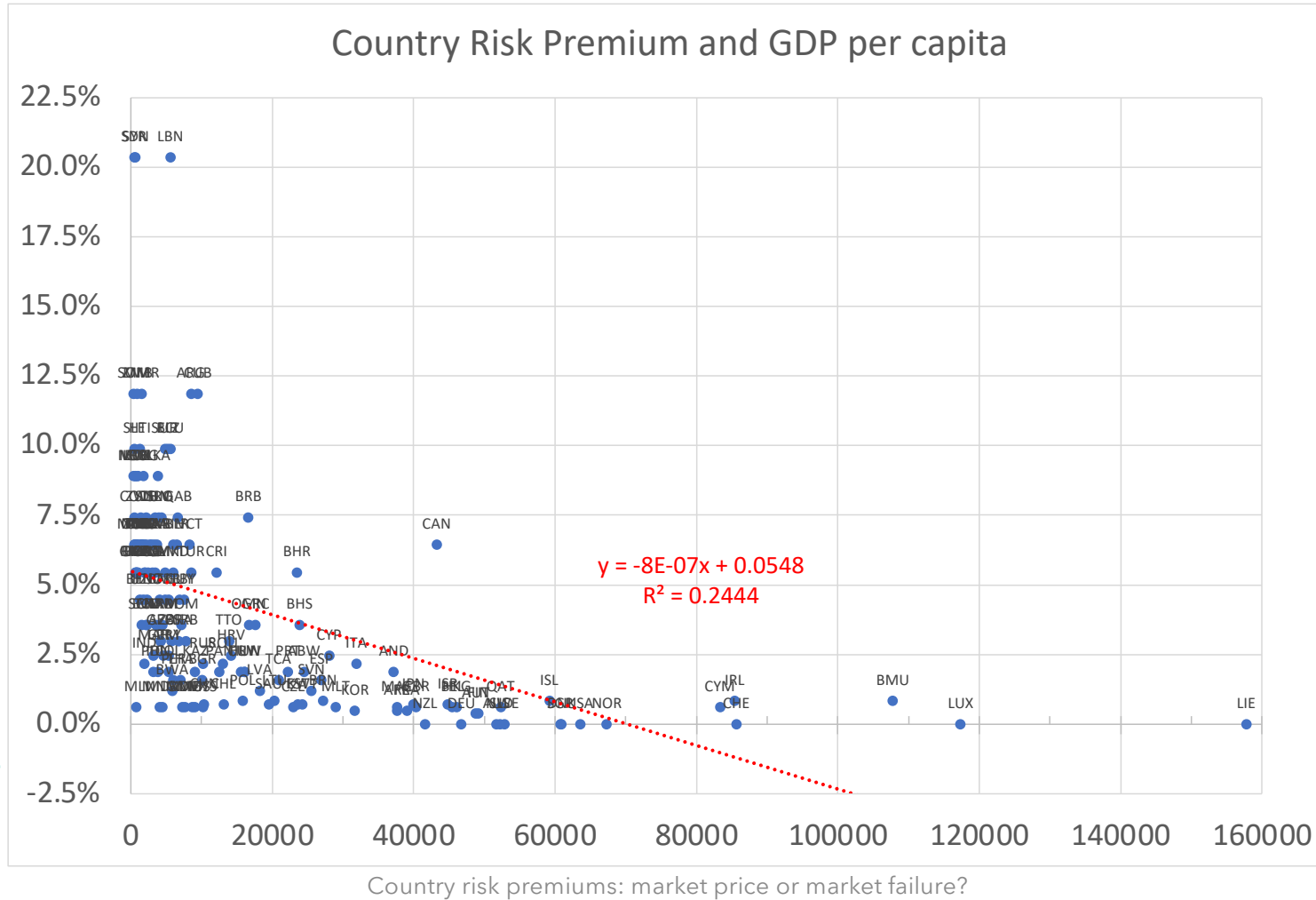
Country Risk Premium and GDP per capita

y = -8E-07x + 0.0548
R² = 0.2444

CRP and Gini indexes

CRP and GINI Index - Source Domaran (2022) and WB (2022)

y = 0.0017x - 0.0367
R² = 0.1102

Credir Risk Premium (Domaran, 2022)

Gini index (WB World Development Indicators)
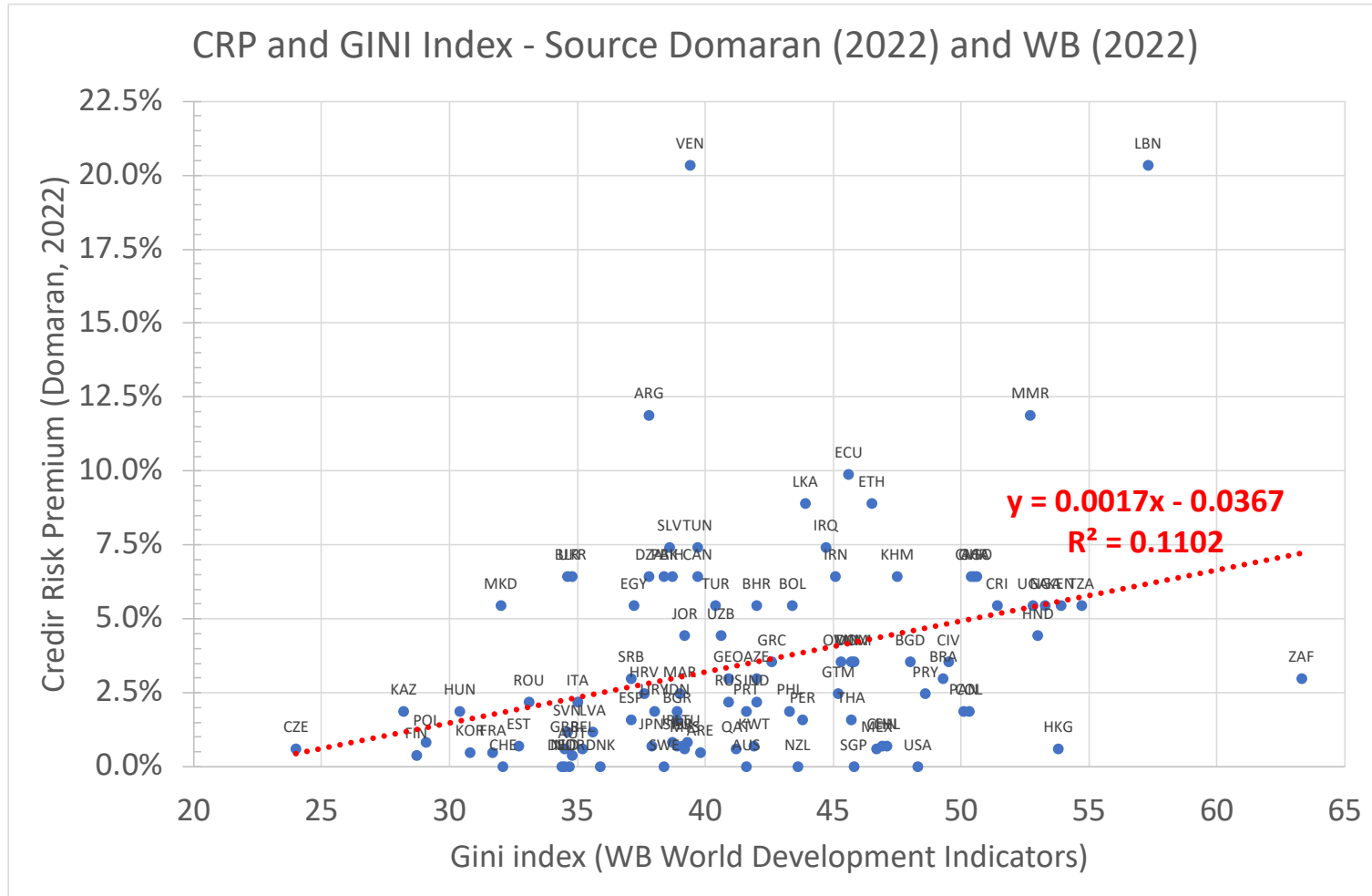
EMBI for Dev. Countries and Latin America 2018-20
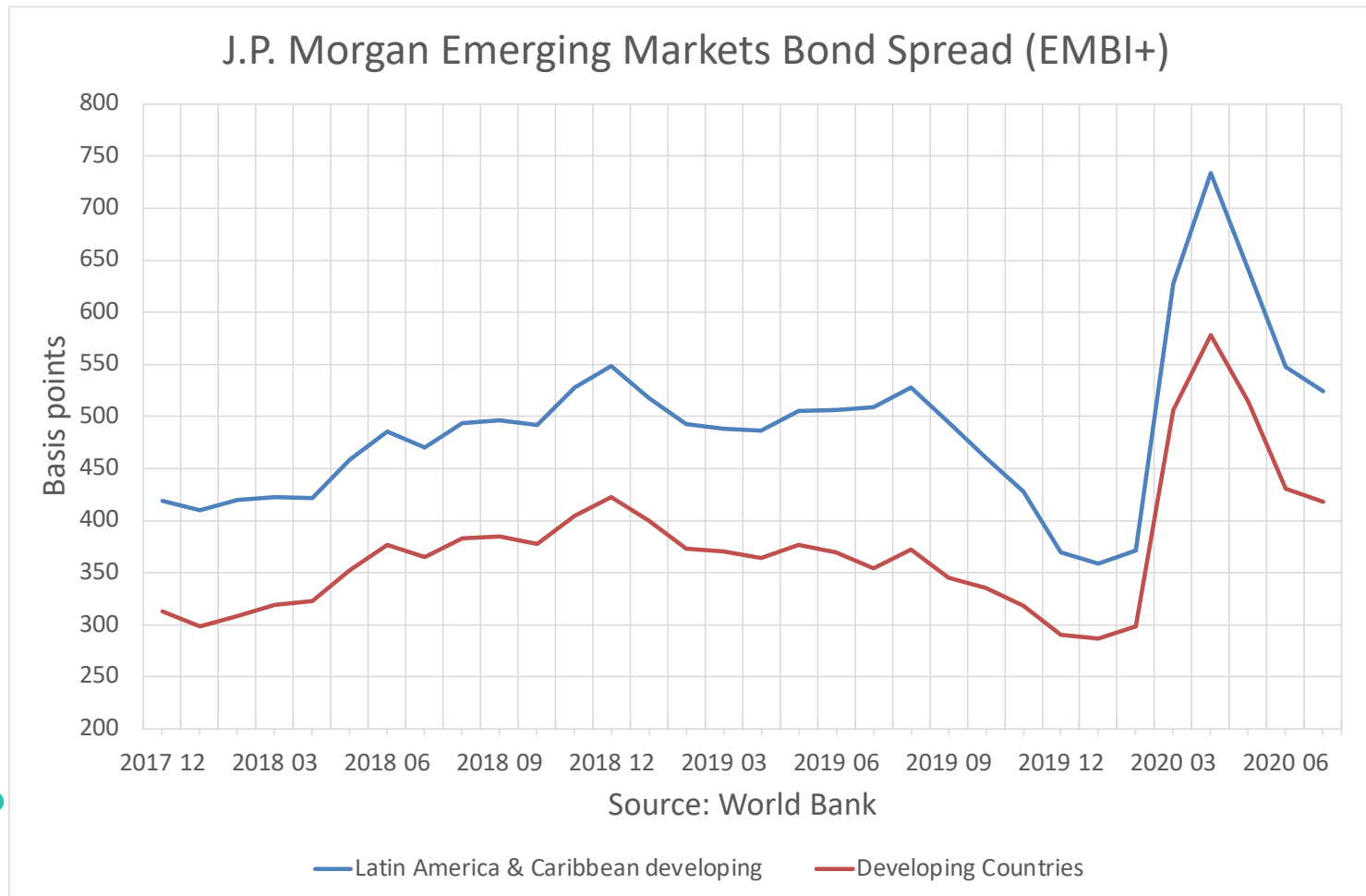
J.P. Morgan Emerging Markets Bond Spread (EMBI+)

Source: World Bank

Latin America & Caribbean developing — Developing Countries

2. Country risk premiums and exchange rates

The foreign currency risk premium (1)

Assuming a loan maturity of 10 years, the Figure shows the service flows of the loan repayments discounted by the interest rate r. After 10 years the difference between the sum of the repayment flow evaluated in hard and local currency is of the order of 5% of the initial face value of the loan (some 500 basis points), or a annual spread of some 50bp for a 1% annual depreciation of the local currency.

Comparison of debt service flows in foreign and local currency

Assumptions
m= 10
r= 2.50%
e= 1.00%

$$S_{HC_t} = \frac{1}{(1+r)^t} \left| \frac{1 + r*(1 + m - t)}{m} \right|$$

$$\sum_{t=1}^{m} S_{HC_t} = 1$$

$$S_{LC_t} = \frac{1}{(1+e)^t} \frac{1}{(1+r)^t} \left| \frac{1 + r*(1 + m - t)}{m} \right|$$

$$\sum_{t=1}^{m} S_{LC_t} = 0.9507$$

Reapyment flow in % of the face value of the loan

Time t

● Service in hard currency SHC   ■ Service in local currency translated SLC
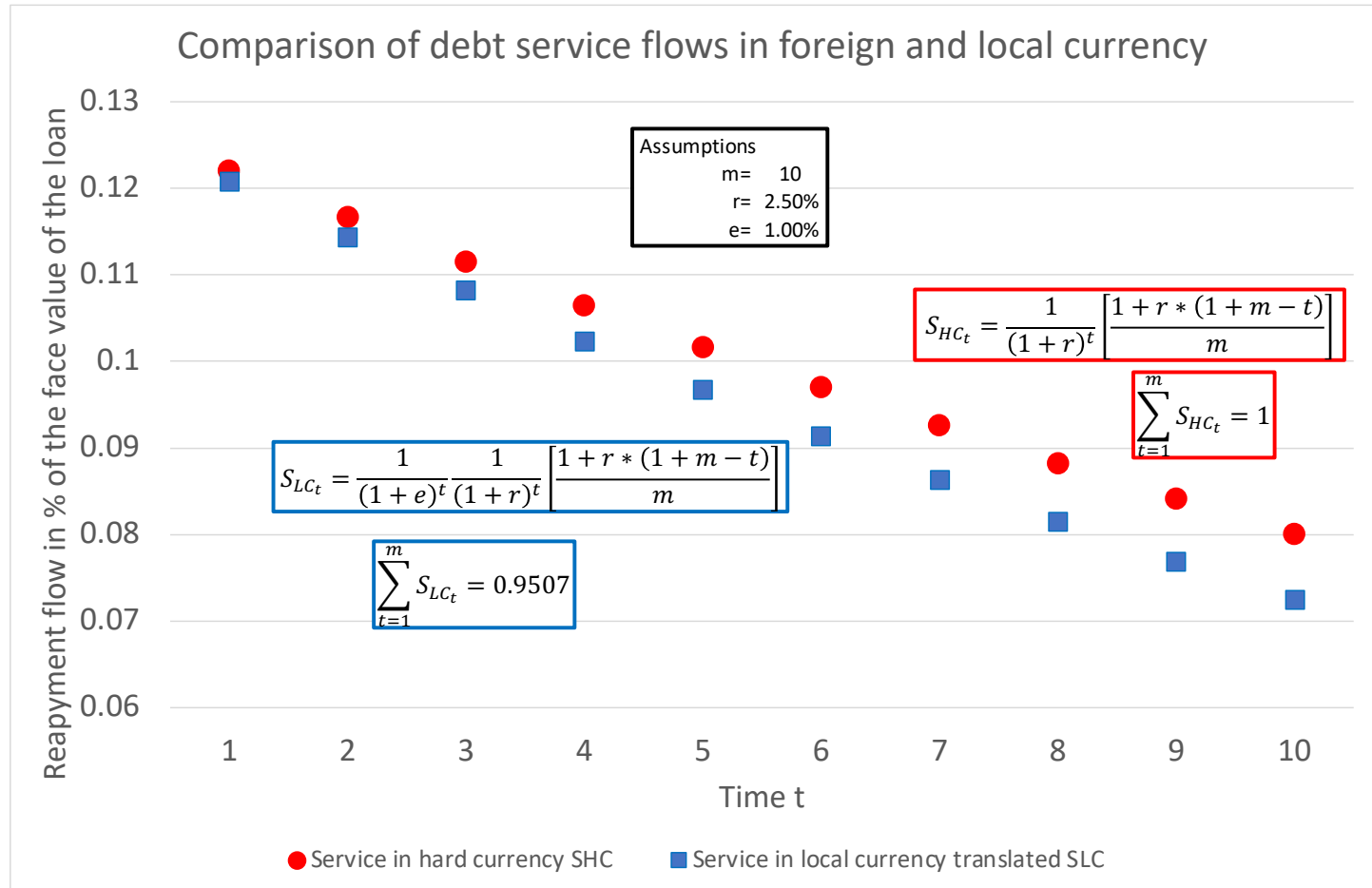
The foreign currency risk premium (2)

Size of the market, predictability

- The foreign exchange market is the world's largest financial market, of a size of 10 times that of global equity markets (Mancini, Ranaldo & Wrampelmeyer, 2013). In 2022, BIS estimated its daily turnover at USD 7,506 bn, up from USD 1,934bn in 2004 (BIS, 2022).

- Already in the 80s, the lack of explanations for the level of exchange rates was noted as a possible cause for their non-predictability (Meese & Rogoff, 1983). Since then, improvements have been negligible or unimpressive (see Faust, Rogers & Wright, 2003; Kiliana & Taylor, 2003, Engel & West, 2005; Priewe ,2017; Cingolani, 2022; Itskhoki & Mukhin, 2021).

Itskhoki & Mukhin (2021) and Itskhoki (2022) ER's puzzles

PPP puzzle (Rogoff 1996): tight comovement of real and nominal exchange rates;

Backus and Smith 1993 puzzle: the weak negative correlation between real depreciations and relative consumption growth;

UIP and forward premium puzzles (Fama, 1984): systematic deviations from uncovered interest rate parity,

Meese and Rogoff (1983) disconnect): excessive exchange rate volatility relative to other macroeconomic aggregates and general lack of robust comovement between the two.

The foreign currency risk premium (3)

The Mussa puzzle

"[...] an additional challenge for the models arises from the experience of the countries shifting from an exchange rate peg to a floating regime – the Mussa puzzle. Specifically, Mussa (1986) famously observed that the end of the Bretton Woods System of fixed nominal exchange rates in 1973 led to a dramatic change in the behavior of the real exchange rate without any accompanying systematic change in the behavior of other macroeconomic variables (Baxter and Stockman 1989)." (Itskhoki, 2022).

Discussion

Itskhoki & Mukhin (2021) model exchange rate disequilibrium dynamics as driven by various types of exogenous shocks, amongst which they interestingly give prominence to "financial shocks". However, they seem to retain a form of money neutrality in the explanation they give of the Mussa puzzle , which somewhat contradicts the "non-complete markets" assumption they accept otherwise and reduces the overall persuasiveness of their description of the financial sector. Moreover, while ingenious, their parsimonious explanation of the main empirical puzzles through exogenous shocks of various nature somewhat restricts their claim that exchange rates are "predictable".

The foreign currency risk premium (4)

Dahlquist & Pénasse (2022).
Rogoff (2009) and Taylor (2004)

- Examine monthly data from 1976 to 2020 on exchange rates (spot and one month forward) and related variables for the G10 countries.. Considering additional explanatory variables such as the real exchange rate (observed) and the "missing risk premium" factor (unobserved), the quality of the statistical adjustments improve, as well as their predictive power of the regressions retained. The latent variable "missing risk premium" is the main determinant of the exchange rate.

- Rogoff's(2009): it remains difficult to forecast exchange rates. Taylor (2004a and 2004b) showed that this results from an indeterminacy problem that arises in two country open macroeconomic models with stock flow consistency.

Conclusion

Notwithstanding Dahlquist & Pénasse's and Itskhoki (2022) predictability claims, Rogoff's (2009) assessment that it remains difficult to forecast exchange rates remains valid.

Given the inevitable link that exists between credit risk premia in international markets and the exchange rates, the theoretical results on the indeterminacy and lack of predictability of the exchange rates also have consequences for the international credit spreads, which, as discussed in the previous section, tend to penalise fragile countries (see also Crespo Cuaresma, Huber & Onorante, 2020)

Credit spread in domestic currency (1)

Credit risk as assessed by domestic markets

The determination of credit risk premiums can be analysed separately from the possible influence of exchange rates by looking at loans in local currency on the domestic market. In the previous example, if, irrespective of the exchange rate, the interest rate r of the loan is not determined under competitive conditions, it will include a spread over the free-risk rate which results from a market failure (market power of the credit supply, or other).

In markets characterized by high uncertainty and ambiguity of information price discrimination can give price-making power to lenders a point made by Scitowsky (1964). The empirical work on credit markets (Jaffee, 1978) prompted the first economic analyses of disequilibrium, developed by Benassy, Drèze and Malinvaud . But results in the literature are not univocal (Tisdell, 1968).

Oliver, Salas Fumás & Saurina (2006)

Examined for each Spanish bank the monthly annual interest rates quoted for four different loan products (receivables, credit line, personal and mortgages) from 1988 to 2003. The variable they looked at is the average of interest rates quoted for new loans granted by the banks during the previous month. They found significant market power on the side of credit supply. Depending on the product, **Lerner indexes (LI) were between 27% and 37%.** The LI is the % excess of the interest rate that exceeds the bank's marginal cost of lending, in turn equal to the interbank loan rate corrected by a risk premium corresponding to the class of risk of the borrower. IF LI calculated with respect to the interbank rate higher values result, between **32% and 52%** depending on the product.

Credit spread in domestic currency (2)

Mainstream finance models

- The Capital Assets Pricing Model (CAPM), the Arbitrage Pricing Theory (APT) and the continuous time Option Pricing Model (OPM). Under certain conditions can be related to each other and to general equilibrium theory (Duffie 1991).
- The Fundamental Theorem of Asset Pricing (FTAP) deals with risk neutral probabilities and the necessary and sufficient conditions for a market to be arbitrage-free and to be complete (Pascucci, 2011, 22-34).
- Brenann (2008): two approaches for valuation of financial assets under uncertainty: (i) arbitrage arguments; and (ii) equilibrium obtained by equating endogenously determined asset demands to asset supplies, taken as exogenous. CAPM does not necessarily retain a no-arbitrage assumption needed to provide a bridge with General Equilibrium Theory, contrary to FTAP, APT and Merton-Scholes option pricing), for which "expectations of the future normalized prices are equal to the current prices" (Pascucci, 2011, p. 22).

Static and sequential general equilibrium models

- Extending Hicks'(1939, 136-40) distinction between "spot" and "futures" economy to a comparison between the static intertemporal general equilibrium, and a sequential temporary equilibrium such as that presented by Roy Radner (1972), allows to characterize the conditions for the existence of "expectational market failures", (Guesnerie, 2001, 2013) that refers to a situation where, in the absence of rational expectations agents cannot anchor their expectations to a common view of the future on which they can draw individual plans with reasonable comfort that they have a chance of succeeding.

Credit spread in domestic currency (3)

High risks, ambiguity and radical uncertainty

- Most financial risk distributions are asymmetric and skewed (Rachev, Menn & Fabozzi , 2005; Adcock, Eling & Loperfido, 2015, Mandelbrot, 2008). The interpretation of how financial markets work need to be changed (Brockett & Kahane, 1992). It is not clear how theorems such as the FTAP can still hold

- Under skewed distributions, it is more likely that situations of ambiguity arise, where it is not possible to evaluate precise point estimates of probability nor is it clear how conditions such as those of the FTAP theorem may hold.

- If distributions were normal (Bachelier ,1900), the frequency of financial crisis should be much lower than what is observed. (Mandelbrot and Hudson, 2004, p. 13).

Empirical aspects

- Meyer, Reinhart & Trebesch (2022): 266,000 monthly prices of FC government bonds of 91 countries between 1815 and 2016: "*the returns on external sovereign bonds have been sufficiently high to compensate for risk. Real ex post returns average more than 6% annually across two centuries, including default episodes, major wars, and global crises. This represents an excess return of 3%–4% above US or UK government bonds, which is comparable to stocks and outperforms corporate bonds. Central to this finding are the high average coupons offered on external sovereign bonds. The observed returns are hard to reconcile with canonical theoretical models [...].*"

3.Market failure for credit risk premiums (CRP)

A microeconomic static notion that requires a reference

Market failure is a relative notion

- It requires a reference "optimal" term to which a real-life situation can be compared (Ledyard, 2008).

- The Maximum Efficiency (ME, Allais, 1978 concepts generalises the Pareto principle of maximum ophelimity.

- Allais' Rendement social was defined by comparison between ME and <u>any</u> suboptimal state. Unfortunately, this does not deal with uncertainty. Under uncertainty, one remains with situations that are very close to the frontier of maximum efficiency (Allais (1953a and 1953b).

Defined in static terms no reference to space and distance

- There is no consideration for aggregate market failure other than as an addition of individual deviations from the optimum, under the assumption that the total deviation is the sum of the individual ones

- One would prefer to have a concept of market failure that extends to dynamics, applies to space and distance and allows for avoiding the fallacy of composition when aggregating. For instance, aggregate dynamic market failures may result in a lack of aggregate investment that constraints growth possibilities, which is also a form of inefficiency and a macroeconomic market failure.
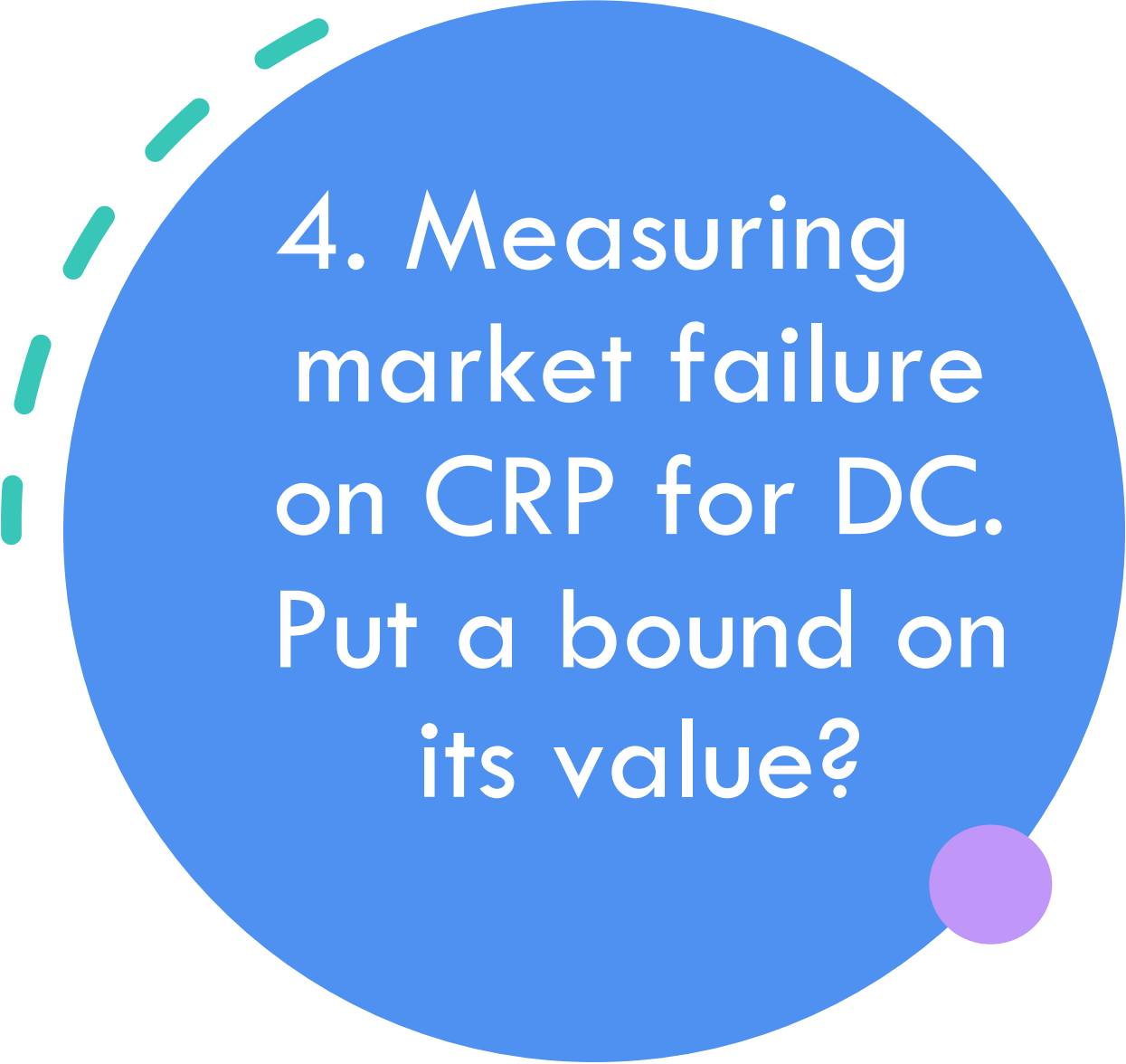
ME is not EMH. Credit rationing and insurance

ME is not EMH

- ME can easily be confused with the Efficient Market Hypothesis (EMH) popularized by Fama (1970 & 1991), which implies that financial markets use efficiently all available information and therefore the assets' financial returns are unpredictable. While there are several reasons to doubt about the EMH, it makes sense to retain the notion of ME as a basis for defining market failure. There are not many alternative and the concept can be used under non-neoclassical equilibria.

- From ME perspective, lack of predictability is seen as a failure of theory to explain the facts which means that it is not possible to achieve equilibrium, (expectational market failure).

Credit rationing and insurance

- Credit risk premiums are rather likely to contain an element of market failure due to market power , particularly if exchange rates are taken into account.

- Credit rationing (see Calomiris, Longhofer & Jaffee, 2008) provides theoretical evidence for market failure although empirical evidence on credit rationing is weak.

- With reference to insurance markets, the presence of ambiguity has been reported to imply contingent prices set well above actuarial levels, i.e. with margins that exceed the possible risk (Kunreuther & Hogarth, 1992).

4. Measuring market failure on CRP for DC. Put a bound on its value?

Quantifying CRP market failure for SDG purposes

Need to quantify market failure

- Question of relevance for the realisation of the SDG as it tries to shed light on the amount of public support from lender countries that would appear to be justifiable based on standard market failure arguments when supporting the realisation of the SDGs.

- Increasingly, a preliminary requirement to obtain public support for development actions is to demonstrate the presence of a market failure (EC, 2021, p. 42).

- Assume that in each country i the observed risk premium for each borrower j (CRPij) is the sum of two elements: the market failure (or markup) element (M_{ij}) and the balance of the aggregate actuarial risk elements (AR_{ij}). At aggregate level in each country i one has $CRP_i = M_i + AR_i$, where M_i and AR_i are not simple sums over j, because some risks will compensate each other.
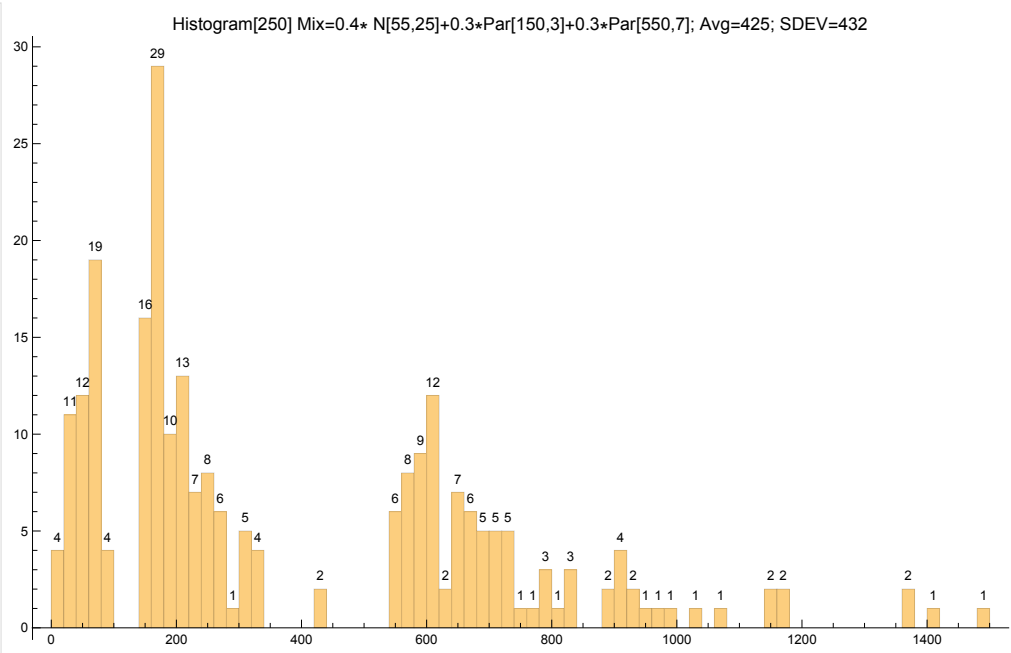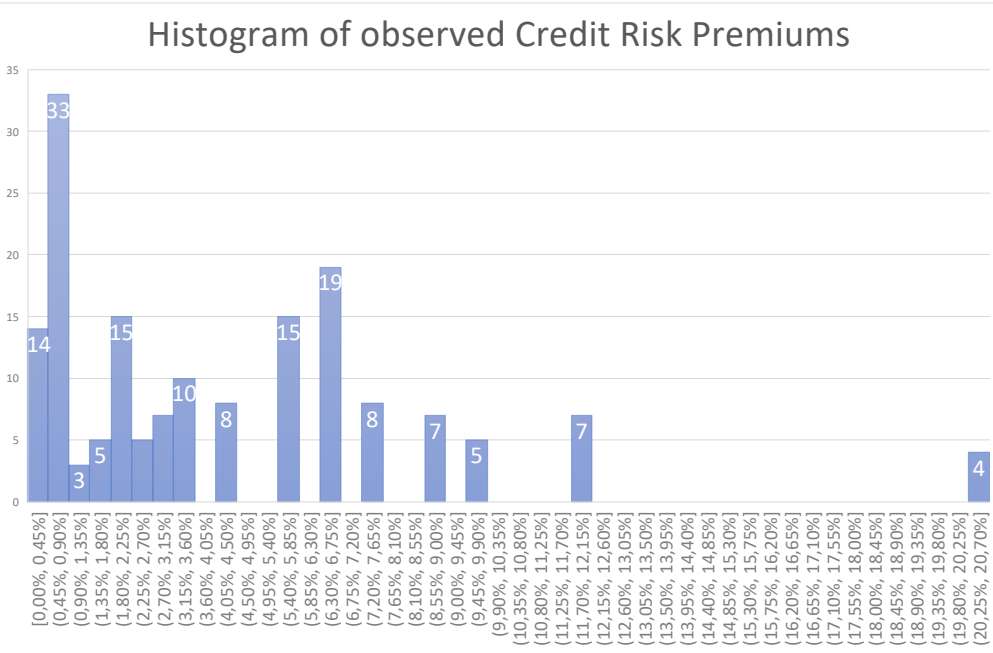
A suggestion to be discussed

- At aggregate level one should consider separately the two possible main components of market failure M_i: the one relating to imperfections in financial markets (say MCR_i), for which a figure of the order of 600bp was estimated in the literature on the risk equity premium (see for instance Gollier, 2001, pp. 68-70), and the one relating to the indeterminateness of the exchange rate (say MER_i), for which a lower bound of the order of 100-150bp can be advanced. Adding up the two gives some 700-750bp as a rough possible range for the CRP total market failure. Considering it seems prudent to retain preliminarily a figure of 300bp as a possible lower bound for the credit market failure relating to loans in foreign currency, which is at the lower hand of the 300-450bp range estimated by Meyer, Reinhart & Trebesch (2022) . This is a provisional and tentative threshold value offered for discussion that should be investigated and checked in future research.

Discussion (1)

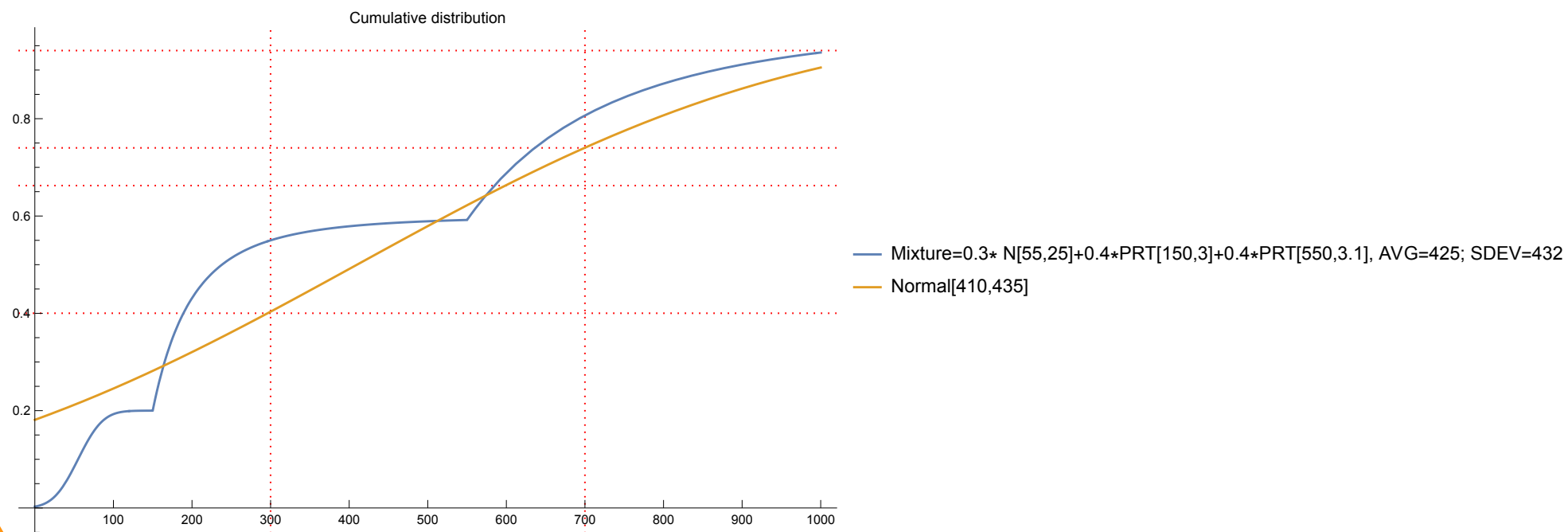**Histogram of the observed CRP distribution (left) and adjusted one (right)**

Discussion (2)

Cumulative distribution of the adjusted distribution

Cumulative distribution

Legend:
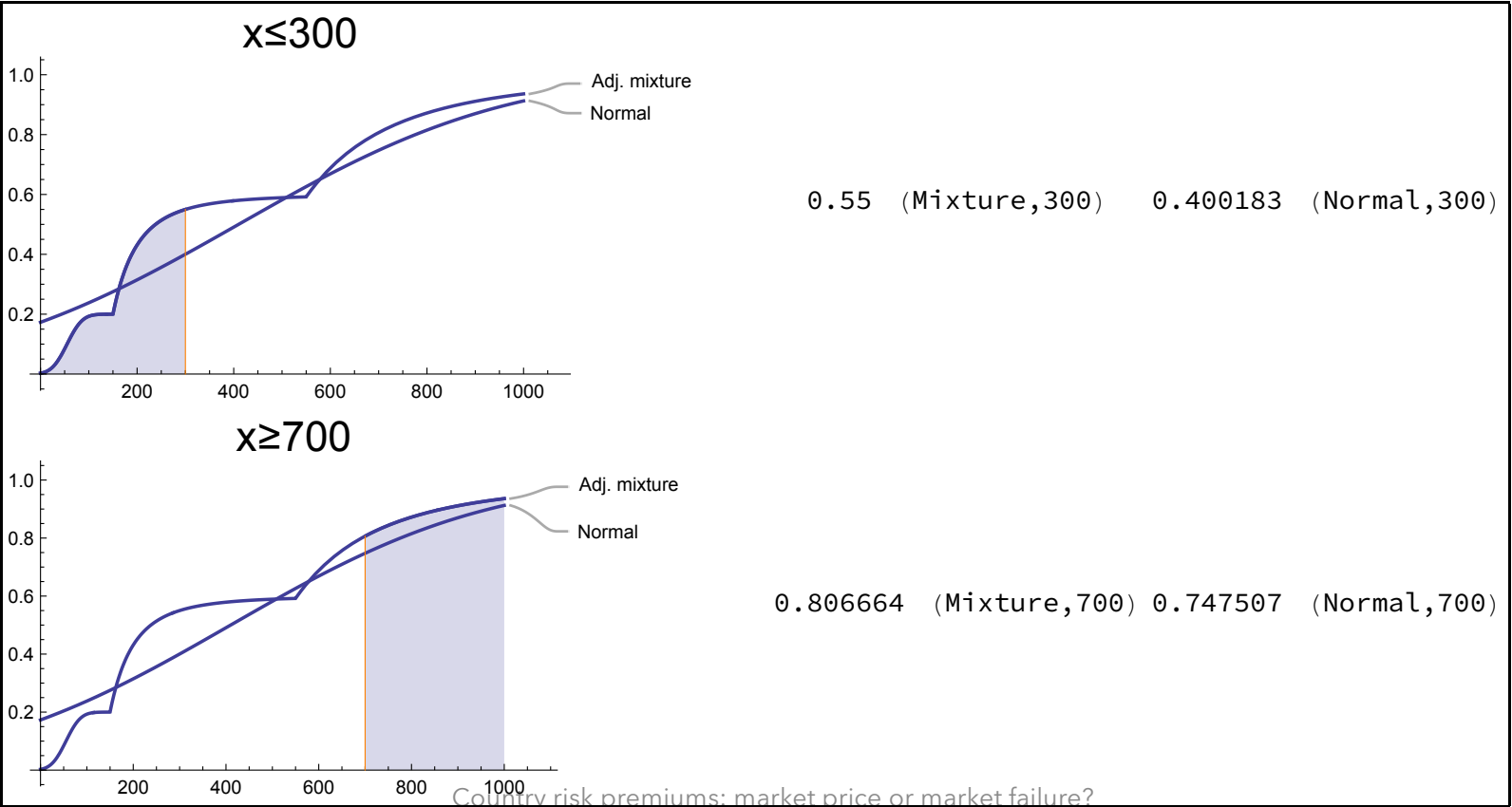- Mixture=0.3∗ N[55,25]+0.4∗PRT[150,3]+0.4∗PRT[550,3.1], AVG=425; SDEV=432
- Normal[410,435]

Discussion (3)

Adjusted cumulative distribution and normal distribution with left and right-hand tail thresholds for the market failure estimate

x≤300

0.55 (Mixture,300)   0.400183 (Normal,300)

x≥700

0.806664 (Mixture,700) 0.747507 (Normal,700)

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Conclusion

The purpose of the above discussion was to clarify the notion of market failure in credit risk markets with particular reference to credit in foreign currency. There are convincing theoretical and empirical elements pointing to the fact that observed credit spreads are not the ME ones and therefore there is a presumption of market failure which justifies public sector intervention in credit markets, particularly in developing countries' contexts.