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# Unsustainable Global Macroeconomic Trends : New Granular Macro-net Models for Macroeconomics and Macro Prudential Policy

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Economics Department, University of Essex I acknowledge research inputs from Inacio Manjama and Qi Zhang; Network graphics have been developed with Simone Giansante and Ali Rais Shaghaghi Roadmap: 3 Major Sources of Economic Malaise and Unsustainable Trends In Advanced Economies: Cross border & Within Economy Imbalances

- Low GDP Growth and Extreme GDP Volatility such as the Great Recession not anticipated by traditional macroeconomic models
- Falling Wages and reduced share of gross operating profit (GOP) except of the financial sector
- Very low rates of real investment
- →Growing wage and income inequality

If not addressed can derail US/UK and Eurozone economies, with global consequences, for foreseeable future.

# Much talk about imbalances and systemic risks: How to model this ?

- Urgent need to integrate finance and macroeconomics
- Bracke, Thierry, et al. (2010) define global imbalances as 'external positions of systemically important economies that reflect distortions or entail risks for the global economy.' By their definition, these external positions encompass not only current account positions, but also financial positions.
- By far the most important imbalance is the persistent US-China one
- Generally, Gourinchas and Rey (2005) state the 'exorbitant privilege' of the US as reserve currency that enable it to run large external current account deficits. I will show that there are strong structural production network developments that make this hard to reverse.
- My strong view is that key systemic risk factors are none other than the corresponding *within* country structural imbalances in US/UK and Eurozone countries driven by mega trends of globalization, offshoring of supply chains, the 4<sup>th</sup> industrial revolution (part boon, part threat) and QE based panaceas for low growth in these countries

# Focus is on: Impact of following on low GDP growth (Other explanations eg Secular

- **stagnation etc** I. Longstanding offshoring of supply chains in OECD countries has made • domestic production networks to become fragile with loss of local production network connectivity and reduced capacity of domestic systems to sustain wage growth in many sectors.
- II. Financialization has increased size of financial sector with real ٠ industries branching into finance; arrogation of very large percentage of corporate surpluses (over 60% in the US, Stockhammer (2004), Rajan (2005), Philipon (2012), Moosa etc) underscores paucity of real investment in these economies and also the growing income inequality. (Financialization of commodities upending extant system, ditto with mortgages which led to 2007 GFC.)
- III. QE began as fire fighting to revive GDP growth, now become semi-۲ permanent (Mohamed El Erian : only game in town) close to zero or negative interest rate regimes unleashing 'money- go- round' series of carry trades & asset bubbles which exacerbate unstable trends that are already endemic. And no GDP growth too boot: Japanese style

#### Source: The Economist, Intelligence Unit.

http://www.eiu.com/landing/Global\_Imbalances.

About \$4 Trillion (2015) of US securities held by China and Japan alone



## Global Imbalances: US Household Consumption by far the largest node in US centric OECD Intercountry Input-Operate (ICIO) Data



Rebalancing Global Economy: Challenges and International Implications : Should China become more like US/UK or vice versa ? (See, RBA WP Ma et. al. 2014)

Graph 7: China's Expenditure Composition in International Perspective



Source: Penn World Table 8.1

UK-resident banks' sterling lending to UK residents, % of GDP Lending by UK banks to real investments by private non-financial corporations (PNFC) has fallen from 20% in 1989 to a pitiful 8%



### Granular Macro-Net Model Methodology: Back to the future

- Granular macro-economics models the economy as an interconnected system in which economic agents produce outputs which are inputs for other economic agents, either in their production of goods and services or final consumption. Acemoglu et al (2012), Carvalho (2014), (Markose EC913, Lecture Notes)
- Fundamental mathematical characterization of interconnectedness is the matrix representation of the who-to-whom data-Wassily Leontief(1936) and Francois Quesnay (1759).
- How is the global economy interconnected? Wassily W. Leontief, Nobel Laureate Lecture, 1973
- Recently, modern economy modelled as an complex web of specialized production units: Gabaix (2011) argues this network perspective on production linkages can produce novel insights on the sources of aggregate fluctuations.
- Heterogeneity of economic agents in the weighted size of their links matter in stability of systems (Markose 2012, 2013):

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Challenge for OECD Countries :Node 5 Sector Non Depository Credit becomes large and Sector 4 Iron and steel mills cease to provide inputs to to other sectors; Large Holes start appearing like a diseased brain, circa 2011 LHS Stylized (US sectoral network 1995 vs. 2011) Integrated Modelling: Globalization of supply chains, impact of financialization & destabilizing financial carry trades from QE (Magnus Ryner et. al note problems tackled in disparate models unsatisfactory)

- Large and relatively new OECD inter-country input-output (ICIO) data set (62 countries 37 sectors), will be the basis of this cross border macro-net model.
- Value added by sectors comprises mainly of wages and surplus or profits. Using the cross border inputs to domestic sectors, after having identified sectors which have suffered wage share reduction and an attrition in their share of surpluses in the economy, can we quantify role of offshoring and the growth in the size of the financial sector on GDP growth? Analysis focussed on US.
- Can a special role for R&D and ICT in 'new' economy be identified ?
- The network based granular macroeconomics of Acemoglu-Carvalho-Gabaix, as well as the Markose et. al. macro-net approach, identify the disproportionate size of economic actors/sectors as being the major cause, respectively, of GDP volatility and macro-prudential instability.

Markose (2012) Systemic Risk Measures in Networks Similar to Carvalho and Gabiax (2013) GDP Volatility Index for Boom Bust: Heterogeneity of Node Strength

- C&G (2013) show that increases in their fundamental volatility in GDP index come from changes in shares of largest sectors in economies, rather than from their total factor productivity volatilities.
- C&G argue growth of finance sector as a ratio of GDP, relative to other sectors, which accelerated in late 2005 accounts for the end of Great Moderation. Low volatility in GDP in early 1980's-mid1990's due to decline in shares of energy and of heavy manufacturing industries starting in around 1983, making all industrial sectors to have relatively equal shares in terms of GDP.
- Contribution of finance sectors—Depository Institutions, Non-Depository Fls—to fundamental volatility increased tenfold from early 1980s to 2000s, with latest of these sharp movements occurring in mid-1990s and coinciding with rise of fundamental-volatility measure over 1990-2007 :0.44 for Non-Depository Financial Institutions and 0.19 for Depository ones.

Stability of Network Systems Always a Spectral Problem: Maximum Eigenvalue Calculation and not about Prob of Defaults (Linear Stability is most stringent condition eg failure of Tacomo Bridge)

- My work influenced by Robert May (1972, 1974)
- Stability of a network system based on the maximum eigenvalue  $\lambda_{max}$  of an appropriate dynamical system
- May gave a closed form solution for  $\lambda_{max}$  in terms of 3 network parameters, C: Connectivity, number of nodes N and  $\sigma$  Std Deviation of Node Strength :  $\lambda_{max} = \sqrt{NC} \sigma$  $\Delta$  highly assumetric network such as core

Core-periphery one that characterizes many real world financial networks. Note both connectivity and heterogeneity of node strength ( $\sigma$ ) cannot increase and network remain stable

## Global macro-nets being pioneered by Castren and Rancan (2012) and Markose et al (2012, 2013)

- This framework combines cross border exposures of banking systems of countries to the liabilities of different macroeconomic sectors of countries with the latter being constrained by the sectoral flow of funds within the countries (see, Castren and Kavounis, 2009, Barwell and Burrows, 2011).
- Main publicly available data source for global flows :BIS consolidated banking statistics. From 2010, BIS extended to include sectoral breakdowns within countries which in turn has to be embellished with the complete sectoral flows between the sectors of each of the national economies.
- Non- financial industrial sectors as described above will be modelled to yield supply chains or production networks. This global macro-net will be a major way in which the spread of real side imbalances and financial contagion within and across countries will increasingly be studied.

Castren and Racan (ECB 2012 WP) *Phenomenal* Global Macro-net Model With National Sectoral Flow of Funds To Track Global Financial Contagion! Only Problem- the Castren-Racan Systemic Risk Analytics Fail to have Early Warning



The circle in the center represents banking systems that are exposed to the cross border liabilities of sectors (household, non bank corporate, public etc) within countries. The latter with sectoral flow of funds are given in the outer circle

This framework enables identification not only of which country poses systemic risk to 15 global banking, but also which sector of this country is the source of liabilities



#### 2010 BIS 22 Reporting Banking Systems Macro Network: Sectoral Analysis NOTE DATA GAPS

Systemic Risk Modelled as a Stability Problem : Maximum Eigenvalue Lamda max) of Specially Constructed Leverage Matrix Based on Publicly Available BIS Data Global Banking Network for Core Countries with Exposures of National Banking Systems Relative to their Capital (Markose, Eterovic, Gatkowski, Giansante 2015) Comparison with Co-Var, MES, SRISK Notice Habilities based lamda max systemic risk index at 40% potential loss of capital in system(RHS Axis) shows no great decrease in global risk of core BIS countries(red arrow) while market price based ones (LHS Axis) do (purple arrow)



Ranking of Systemic Importance (S.I)of BIS Reporting Banking Systems Using Cross Border Network Centralities : Note prior to 2008 Q2 US Was S.I ; *Post 2008 Q2 UK Banking Most S.I* 

Oversized UK Banking (Blue Arrow)



Proposal: Use Intercountry Input-Output (ICIO) OECD Data, Including Cross border financial flows to implement Global Macronet; The structure below becomes block diagonal with intercountry components Source: Wixted et al (2006)



Relationship Between Network Centrality and Leontief Inverse

• Consider our OECD ICIO Matrix with 34 Sectors (consolidated to 13 Sectors for convenience)

 $\mathbf{x} = \mathbf{A}\mathbf{x} + \mathbf{d}$ 

- x is the vector of sector outputs, A is the Leontief Technology matrix and d is the vector of final demands : a<sub>ij</sub> = x<sub>ij</sub> / x<sub>j</sub>, input of sector i to produce 1 unit of sector j
- x= (I- A)<sup>-1</sup> d
- Leontief Inverse matrix (I-A)^(-1) shows output rises in each sector due to the unit increase in final demand. I is the identity matrix
- GDP Y =  $\sum_i x_i$  Total sum of output of sectors

Now consider formula of Katz-Bonacich Centrality

 $C_i = \lambda \sum_j a_{ij} C_j + \beta$ 

 $\beta$  is some scalar initial centrality based on elements of the system that is not part of the interconnected production system.

In Matrix notation

$$\mathbf{C} = (\mathbf{I} - \lambda \mathbf{A})^{-1} \boldsymbol{\beta}$$
 (iii)

The Leontief inverse function that is approximated by centrality of the sectors can be re-written as:

$$(I - \lambda A)^{-1} = L^c$$

 $x^c = L^c d$ 

$$Y = (L^c d)' 1 \qquad \rightarrow Y \equiv (C' d)' 1$$

Then Aggregate volatility of GDP as standard deviation of

 $Var(InY)^{1/2} = (Var((L^{c}d)'1)^{1/2})^{1/2}$ 

$$\cong \{\sum_{i}^{n} c_{i}^{2} ( \operatorname{var} [ \ln [ \sum_{k}^{m} d_{ik} ] \}^{1/2} \}$$

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## STEP 1: TRANSFORM INPUT-OUTPUT MODEL INTO NETWORK MODEL STEP 2: GHOSH SUPPLY SIDE COSTS DRIVEN VARIANT

Step 1: "As a result, aggregate growth and volatility in the multisector model now depends on a well-defined network object: the collection of network centralities of the different production technologies.

Intuitively, more central production technologies in the production network - those having more direct or indirect downstream customers are relatively more important in determining aggregate volatility." Carvalho (2014)

Step 2: Finally, in order for us to study the impact on GDP growth of falling wage shares of some sectors and growing share of value added of the finance sector, Ghosh variant of the inverse function is needed.

Supply driven Ghosh Model (Dietzenbacher (1997) and Miller and Blair (2009) : To analyse impact of changes in sector wages or Gross profits sector shares on GDP

• Let  $x_{ij}$  be the value of intermediate goods from sector i to  $j, x_i$  be the output of sector i, the output coefficient is given by  $b_{ij} = \frac{x_{ij}}{x_i}$ : sector j's share of i's output to produce 1 unit of j and  $v_i$  is sector i value added (wages, share of gross profits and taxes less subsidies). The output of sector i can be given from a different perspective, as shown below  $x_i = b_{1i}x_1 + b_{2i}x_2 + \dots + b_{ji}x_j + \dots + b_{ni}x_n + x_{ROWi} + v_i$ 

Hence, in matrix notation:  $x' = V'(I - B)^{-1}$  $(I - B)^{-1}$ : Ghosh Inverse Matrix B : contains *allocation coefficients* 

# Hypotheses tested: Results

- What is the impact of loss of connectivity in offshored supply chains for US? Can the evidence of new supply chain connections in the US economy compensate for this?
- What impact is there on US GDP with the greater share of Gross Operating Profits going to the financial sector ?
- Beck (2012) the negative impact of the excessive growth of the financial sector on GDP growth and volatility is so because of several reasons, namely (i) Reason for the non-linearity of the finance-growth relationship might be that financial development helps catch up to the productivity frontier, but has limited or no growth effect for countries that are close to or at the frontier (Aghion et al., 2005); (ii) Financial system might actually grow too large relative to the real economy if it extracts excessively high informational rents and in this way attracts too much young talent towards the financial industry and depleting the real economy of talent (Bolton et al., 2011; Philippon, 2010); a view also emphasized in Cecchetti and Kharroubi (2012).
- What is the impact on US GDP from falling wage share in key sectors ?

Replacement of Domestic Inputs by Foreign Inputs and Weighted Outdegrees given by row sum of Leontief technology coefficients vs Eigenvector Centralities (EVC) of Sectors

Note : Increased outsourcing of supply chains in key sectors has been extensively studied:

Hummels et al (2001)-OECD countries outsourcing

accounts for 21 percent of their exports and it grew at

the rate of 30 percent over 1970-1994. Hijzen et al

(2005) for UK data - by 33 percent (1984) to 40 percent

(1995). Parteka and Derlacz (2013) show in EU27 (from

26 of VA in 1995 to 42 percent in 2008: Input-Output non-network approach

Connectivity and Node Strength Measures of key sectors/nodes in the US Production Networ

#### Row sum of the Leontief Technology Matrix A

Using the Leontief technology coefficient  $a_{ij} = \frac{x_{ij}}{x_j}$ , following Carvalho (2014), the weighted out-degree of sector *i* can be defined as  $d_{out}^i = \sum_{j=1}^n a_{ij}$ . "According to this weighted measure, the typical input-supplier in the data has a weighted out-degree of about 0.5" Carvalho (2014).

- Degree
  - Number of edges connected to a node.
- In-degree
  - Number of incoming edges.
- Out-degree
  - Number of outgoing edges.



# 1995- 2011: Evidence forConnectivity holes in US production network

- Overall, 679 out of 1156 (34\*34) Leontief coefficients(62.35 percent of total US technology coefficients) show a decrease in its value from 1995 to 2011.
- Summary of Table overleaf:
- The greatest loss of connectivity in the US over the period of 1995-2011 has been in the computer and electronic equipment sector, while the greatest new connector ushering in the 4<sup>th</sup> industrial revolution is the role of R&D and related business activities (USA\_C73T74BZS) which has increased from 1.36 to 1.81.
- The absolute loss of weighted row sums of Leontief coefficients which is estimated at -2.0369, relative to the absolute gains of 1.192 shows that since 1995, US domestic supply chains loss of connectivity is twice as great as the gains.
- Conjecture: Using the node strength measure as proxy for centrality, for any given level of final demand, some normed measure of this loss of connectivity measure will give the loss of GDP from fragility in domestic supply chains from outsourcing. Recall, the Leontief inverse can be approximated by centralities of production sectors, hence GDP defined as

The changes (1995- 2011) in Weighted Sum of Outdegree (given by row sum of Leontief technology coefficients for a sector) :US ICIO Data Calculations by Qi Zhang Note: by 2011, 22 of the 34 US Sector suffer a loss in terms of supplying inputs to other sectors of the economy

	1995	2011	Change in outdegree
USA_C30.32.33CEQ	0.5382	0.2152	-0.3230
USA_C17T19TEX	0.2325	0.0521	-0.1804
USA_C50T52WRT	2.1347	1.9694	-0.1653
USA_C21T22PAP	0.6075	0.4712	-0.1362
USA_C29MEQ	0.4679	0.3401	-0.1278
USA_C20WOD	0.3555	0.2324	-0.1230
USA_C40T41EGW	0.3019	0.1886	-0.1133
USA_C25RBP	0.3739	0.2646	-0.1093
USA_C34MTR	0.3816	0.2784	-0.1032
USA_C31ELQ	0.1892	0.0968	-0.0924
USA_C28FBM	0.6588	0.5742	-0.0846
USA_C26NMM	0.2577	0.1802	-0.0774
USA_C15T16FOD	0.3938	0.3224	-0.0714
USA_C90T93OTS	0.3583	0.2877	-0.0705
USA_C36T37OTM	0.1456	0.0787	-0.0669
USA_C64PTL	0.4129	0.3601	-0.0528
USA_C24CHM	0.7613	0.7145	-0.0468
USA_C45CON	0.1840	0.1457	-0.0383
USA_C35TRQ	0.1911	0.1567	-0.0345
USA_C55HTR	0.1502	0.1353	-0.0149
USA_C85HTH	0.0346	0.0324	-0.0022
USA_C70REA	0.4841	0.4827	-0.0014
USA_C80EDU	0.0971	0.0958	-0.0013
USA_C60T63TRN	0.6691	0.6710	0.0019
USA_C75GOV	0.1723	0.1762	0.0039
USA_C01T05AGR	0.5236	0.5353	0.0118
USA_C65T67FIN	0.7854	0.8309	0.0455
USA_C71RMQ	0.0721	0.1191	0.0470
USA_C10T14MIN	0.6767	0.7627	0.0859
USA_C27MET	0.7031	0.8401	0.1370
USA_C72ITS	0.1296	0.2957	0.1660
USA_C23PET	0.2133	0.4520	0.2388
USA C73T74BZS	1.3605	1.8148	0.4543

and Interesting Significance (Right EVC) of R&D in netted System (RHS) **Evidence of fully fledged US 4<sup>th</sup> Industrial Revolution** EVC: Eigenvector centrality

#### NETWORK CENTRALITIES:2000 AND 2009 GROSS MATRICES

#### NETTED MATRICES

	RightEV C 2000	RightEVC 2009	LEFTEVC 2000	LeftEVC 2009	rightEV C 2000	rightEV C 2009	LeftEVC 2000	LeftEV C 2009		
USAGRFISH	0.08	0.06	0.04	0.04	0.13	0.11	0.04	0.04		
USMIN	0.08	0.07	0.02	0.02	0.16	0.19	0.02	0.01		
USMANUF1	0.66	0.43	0.71	0.46	0.17	0.18	0.21	0.18		
USCOMELEC	0.06	0.03	0.07	0.02	0.01	0.04	0.04	0.01		
USMANUF2	0.06	0.04	0.16	0.09	0.03	0.02	0.25	0.13		
USENERWAT	0.07	0.04	0.04	0.01	0.11	0.07	0.01	0.01		
USCONS	0.04	0.08	0.19	0.13	0.08	0.14	0.45	0.29		
USTRADEREN	0.31	0.23	0.23	0.21	0.34	0.31	0.10	0.11		
USTRANSCO	0.19	0.15	0.14	0.13	0.19	0.14	0.01	0.00		
USFIN	0.42	0.62	0.31	0.50	0.32	0.24	0.12	0.17		
R&D , COMP	0.39	0.53	0.18	0.17	0.79	0.84	0.00	0.00		
PUBLIC	0.11	0.12	0.42	0.62	0.00	0.00	0.81	0.91		
USA_C95PVH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	0.04	0.24	0.00	0.00	0 4 0	0 1 4	0.00	0.04		



## Stylized Facts US: Wage Share of Total Value Added fallen:48.5% (2000) – 44.5% (2009) (LHS) Financial Sector Share of % of Total Surplus Grown: 38% (2000) to 40% (2009) (PURPLE, RHS)





# Sectors with large share of imported intermediate goods are suffering absolute decline of wage share (% total wages) ; Others eg Fin, R&D and Construction show only strong cyclicality

#### US (OECD ICIO) IMPORTED INPUTS % TOTAL INTERMEDIATE GOODS

	2000	2009	2011
US_C01T05AGR	7.16	9.20	7.35
US_C10T14MIN	15.35	22.47	15.18
US_MANUF1 (Traditional Shoes;textiles etc)	13.33	16.07	13.59
US_COM&ELECT (Apple etc )	27.67	30.25	31.20
US_MANUF2 (Automotive)	22.23	22.19	27.29
US_ENERWATGAS	13.58	19.86	9.57
US_C45CONSTRUCTION	13.97	16.07	17.83
US_TRADE_RENT	5.36	4.92	5.75
US_TRANS_COM	6.06	8.14	10.01
US_FINANCIAL	2.96	4.26	4.12
US_R&D & COMP	4.69	6.19	4.76
US-PUBLIC	6.42	5.79	8.21



#### SECTORAL WAGES AND SALARIES AS PERCENTAGE OF TOTAL VALUE ADDED

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#### SECTORAL WAGES AND SALARIES AS PERCENTAGE OF TOTAL VALUE ADDED



# Concluding Remarks: So What Are the Challenges to rebalancing ?

- We have shown that fundamental structural dampeners on GDP growth in West, ultimately the source of systemic risk with growing Fin sector share of Gross Operating Profits
- Domestic supply chain connectivity holes in US as yet not compensated by 4<sup>th</sup> industrial revolution new connections (there is clear evidence for latter in US and not so much in UK)
- Lower wage shares of outsourced sectors reduce GDP
- Strong evidence that increasing US Fin Sector share of Gross Operating Profits decreases GDP more in recent years than earlier years
- Important methodological advance of approximating Leontief (Ghosh) inverse with centrality of sectors. Central nodes like Fin sector associated with more volatile final demand while nodes losing centrality associated with falling final demand for its products etc could add to slow GDP growth and extreme GDP volatility

# Global Rebalancing : Avoid Fallacy of Composition

- Guonan Ma et. al China to converge to OECD Countries with Reduction in Export Surplus Replaced by Leverage??
- As long as bubble fuelled financial returns exceeds real returns, financialization will overtake matters
- Financial imbalances (eg. extant Markose network models use BIS data) and offshoring stress must be modelled in a single integrated ICIO network model
- Direction of travel not good due to traditional macroeconomic modelling: QE exacerbating Fin sector imbalances and causing carry trades (UK case used)

## Oversized UK Financial System: UK Banking Cross Border Threats from Leakage of QE funds

- UK Threats posed to other BIS reporting banking systems
- Threats to UK from carry trades
- Systemic Risk heightened from increased lending of QE funds of banks especially to non-bank financial institutions
- Evidence in 2 parts

## Where is the QE Money Going ? Where is it needed ? Example UK: £375 bn QE 25% GDP; QE starts 5 March 2009

Emillion UK Monetary and Financial Institutions Lending to Rest of World (green gets fillip with QE start) MFI lending to ROW and Other Financial Institutions over 50% of total lending



#### http://www.ons.gov.uk/ons/datasets-and-tables/index.html Source

At fraction of the cost and avoid the mayhem of hot cross border money from QE :**Direct P-P Electronic Lending to SMEs From Central Bank Sponsored Platforms** Circumvent the banks whose lending channels have been bust for over two decades QE a blunt instrument with catastrophic consequences An FSB Taskforce to help design such alternative solutions ??

# Lowering Yield Major QE Outcome:Non-Financial Corporations Issued Bonds To Buy Back Shares UK



### Acharya and Steffen Called 2010-2014 Eurozone Crisis: "Greatest" Carry Trade vs Wait Till How the Carry Trade from \$8 Trillion Quantitative Easing Ends Carry Trade Mayhem from \$8 Trillion

#### **Chilling Account of Eurozone Carry Trade Viral V. Acharya and Sascha Steffen**

- Despite differences in country risk ratings, Basel II regulatory framework permit banks to hold govt. debt with zero capital.
- Zero-risk weight on govt. bonds with cheap short-term credit encouraged roaring "carry trade".
- Banks borrow money cheaply from central banks buy highyield debt from eurozone periphery and pocket difference
- Debtors in periphery default,

Net lender banks in Germany and France enjoyed a 'stealth bailout' (Anil Kashyap)And countries like Greece are pulverized Carry Trade Mayhem from \$8 Trillion QE via Lending to Other Financial Institutions and Rest of World

- FX Carry Trades From QE Sterling /Dollar etc : low yields in QE countries has unleashed a chase for EM high yielding (high risk ) debt
- Sterling & Dollar Borrowers in Low interest countries add on a layer of leverage to QE funds before buying EM Assets

### (See, FT 17 Nov. Deeper Into Red)

- In EMs As Hot Money Comes In FX Appreciates and Real Economy and Export Industries Devastated
- Asset price bubbles crash; EM Debtors Default
- Problems Coming home to Roost: Not Just a problem of EMs

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Carry Traders UK/US Lenders of Dollar/Sterling will Get Burnt