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**Paper by invitation**

# Institutional Regimes, Long Wave Systemic Risk and Great International Crisis of 2008-2012

**Summary:** This paper studies the relationship between long-term growth of GDP per capita, institutional regimes of accumulation (ROA), systemic risk and the Great International Crisis of 2008-2010. The principle hypothesis behind the work is that the ROA provides a foundation for long-term growth as a type of fundamental variable, and that this growth provides a buffer against systemic risk in the sense that sustainable growth provides resources for debt provision and employment stimulation. The emergence of a viable ROA is crucial for long waves of growth which stimulate both private sector profit and public sector tax receipts which (using conventional terminology) reduce the structural deficit for both sectors. Low rates of long-term growth, therefore, provide a good indicator of the emergence of "long wave systemic risk" (LWSR), which left such nations vulnerable to uncertainty, financial crisis and recession. The paper investigates the inability of growth for various decades to "cover" instabilities associated with the Great Crisis, leading to high rates of LWSR, especially for European and North American nations that bore the brunt of the crisis.

**Key words:** Institutional regimes, Long wave systemic risk, Great international crisis.

**JEL:** B50, E10, G01, O57, P16.

This paper scrutinises a theme which various authors in *Panoeconomicus* have been highlighting, namely the *systemic and structural origins* of the Great International Crisis and Recession (GIC) of 2008-12 (e.g. Timur Han Gur, Naci Canpolat, and Huseyin Ozel 2011). We start by surveying the performance of the World Economy and continents in terms of the degree of severity and instability of the crisis and recession. Then we indicate the causal processes involved in the differential impact of the GIC, emanating from the institutional environment of the various regions and continents. Then in the third section we estimate *long wave systemic risk* (LWSR) for specific areas and continents as well as various nations of Europe, North America and elsewhere vis-à-vis their ability to "cover" financial instabilities through longer-run growth patterns. We base our analysis partly on scrutinising the rate of growth of GDP per capita for all continents and numerous nations in the Maddison and World Bank WDI databases for 1950-2010, 1990-2010, 2000-2010, 2008-2010 and 2009 periods, respectively. Table 1, below, starts the story by outlining the annual rate of change of GDP per capita during the 2000s.

**Table 1** GDP Growth Rates Per Capita, 2000-2010 Annual Rates, World and Regions

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
World	2.92	0.34	0.71	1.44	2.85	2.35	2.82	2.74	0.33	-3.16	3.05
<b>High income</b>	<b>3.36</b>	<b>0.60</b>	<b>0.85</b>	<b>1.30</b>	<b>2.51</b>	<b>1.90</b>	<b>2.18</b>	<b>1.82</b>	<b>-0.56</b>	<b>-4.21</b>	<b>2.49</b>
European Union	3.66	1.79	0.91	0.89	2.06	1.49	2.79	2.48	0.00	-4.63	1.59
East Eur&C.Asia	3.91	1.72	1.29	1.36	2.67	2.07	3.27	2.93	0.34	-4.68	1.85
North America	3.11	0.11	0.95	1.56	2.58	2.11	1.70	0.95	-0.91	-3.53	2.15
<b>Middle income</b>	<b>4.06</b>	<b>1.78</b>	<b>2.51</b>	<b>4.38</b>	<b>6.34</b>	<b>6.06</b>	<b>6.96</b>	<b>7.51</b>	<b>4.71</b>	<b>1.59</b>	<b>6.49</b>
LACA	2.45	-0.93	-1.69	0.85	4.74	3.63	4.57	4.64	3.16	-2.91	5.01
East Asia & Pacific	3.57	0.94	2.06	2.71	4.07	3.64	4.29	5.07	1.74	-1.26	6.38
MENA	2.68	-0.18	0.1	3.21	4.41	3.46	3.45	3.38	3.31	0.39	..n.a.
<b>Low income</b>	<b>1.23</b>	<b>2.85</b>	<b>0.88</b>	<b>1.62</b>	<b>3.86</b>	<b>3.89</b>	<b>4.18</b>	<b>4.21</b>	<b>3.50</b>	<b>2.52</b>	<b>3.67</b>
South Asia	2.44	2.86	2.04	5.92	6.3	7.16	7.08	7.47	3.24	6.61	7.31
SS Africa	1.05	1.14	0.86	1.64	3.51	3.15	3.67	4.03	2.5	-0.41	2.23

Source: Adapted from raw data in World Bank (2011).

The first stylized fact, identifiable from this Table, is that the severity and instability of the crisis - during 2009 and during 2007-2010 - was closely correlated with the level of socioeconomic development of the region. The most badly affected areas were the relatively high income regions of especially Western Europe, North America and Eastern Europe; variously called the Core (in a CPSP model). These highly developed areas had the most rapidly growing and/or highly dominant financial institutions and market conditions. These areas were intimately connected with the major financial innovations of the 1990s and 2000s, especially the growth of investment banks, collateralised debt obligations (CDOs) and subprime mortgage market bonds (SMMBs). The regions that were both rapidly opening themselves up to international capital and also those regions already heavily penetrated by investment banking institutions were the hardest hit in terms of rate of growth of GDP per capita over the 2008-2010 period, with special emphasis on growth during 2009, the deepest year of the international recession.

The Middle Income areas, or the Semi-Periphery (SP), were affected usually moderately during the whole of 2008-2010, This includes most of the nations of South America, plus East Asia and the Middle East and North Africa. These areas had a moderate level of development of financial capital, neither high nor low, and were only moderately linked into the innovative financial relationships of modern capitalism. Network relationships between households/corporations and financial institutions were only partially innovative and path-breaking. As a result, the degree of instability and low growth were moderate.

The low income areas - the Periphery - were mostly unaffected or much less affected by the Great Crisis - having few major financial innovations and a much lower level of financial sophistication. South Asia and Sub-Saharan Africa (as well as Central America and the Caribbean) were of this type. Having a relatively low

level of sophistication in manufacturing they also tend to have a relatively low level of sophistication in finance. In these areas, major financial institutions such as investment banks, mortgage backed securities and collateralised debt obligations have not become dominant during the 2000s. Having less financial deepening led to less financial instability, and as a result fewer chains of bankruptcy for industry and the housing sector.

## 1. Institutional Regimes of Accumulation, 1950-2010

The main hypothesis of this paper is that the depth and instability of the subprime crisis and recession is related to institutional regimes of accumulation. In other words, the depth and instability of the crisis is positively related to the style and phase of accumulation and growth of the system. Here we link the depth/instability of the crisis at the regional level to long-term rates of growth, as an indicator of long-term fundamentals which influence systemic risk. Table 2, below, outlines the GDP Growth per capita (AAGR) performance of the regions over several decades:

**Table 2** Average Annual Real GDP Growth Per Capita (Decadal Annual Averages), World, Continents: 1950–2010

	World	EU	NA	EE	MENA	LACA	SSA	Asia
1950-59	2.68	4.03	2.09	3.68	3.49	2.03	1.82	3.82
1961-69	3.09	4.03	3.21	3.68	3.90	2.59	2.09	3.77
1970-79	2.01	2.94	2.60	3.26	5.77	3.19	1.30	3.39
1980-89	1.36	1.99	2.06	0.22	-1.63	0.19	-0.68	2.96
1990-99	1.22	1.88	1.91	-0.70	2.07	1.18	-0.60	2.87
2000-10	1.49	1.18	1.08	4.46*	2.42	2.35	2.34	4.32

**Note:** EU=European Union, NA=North America, EE=Eastern Europe, MENA=Middle East & North Africa, LACA=Latin America & Caribbean, SSA=Sub-Saharan Africa.

**Source:** Adapted from World Bank (2011), Maddison (2001, 2006), O'Hara (2012).

Table 3 outlines the long wave taxonomies, below:

**Table 3** Wave Typologies: Periodicity and Amplitude

Wave Type	Acronym	GDP per capita growth rate %	Short wave	Long wave	Jumbo long wave
Very high wave upswing	VHWU	6.01 >	10 years	LWU, 20-30 yr	JLWU 40 years
High wave upswing	HWU	4.01–6.00	10 years		
Wave upswing	WU	2.51–4.00	10 years		
Borderline (B)	BW	2.01–2.50	10 years	BLW, 20-30 yr	JBLW
Wave downswing	WD	1.01–2.00	10 years	LWD, 20-30 yr	JLWD 40 years
Deep wave downswing	DWD	0.01–1.00	10 years		
Very deep wave upswing	VDWD	00.00 & <	10 years		

**Source:** The author's original work.

The above data from Table 2 and long wave taxonomies from Table 3 are now linked to the phases of the long wave that the regions have been undergoing, as shown in Table 4, below:

**Table 4** GDP Growth Per Capita (Decadal AAGR) Wave Periodicities and Amplitudes, World, Continents: 1950–2010

	World	EU		NA	EE	MENA	LACA	SSA	Asia
1951-59				BL			B	SWD	
1961-69	LWU	HLWU	LWU	LWU	LWU	LWU	LWU	B	JLWU
1970-79	B							LWD	
1980-89		LWD***		B	LWD	SWD	LWD		
1990-99	LWD								
2000-10				LWD***	SWU	B-LW	B	B	

**Note:** \*\*\* Main areas of GIC.

**Source:** Adapted from the raw data of World Bank (2011), Angus Maddison (2001, 2007).

Comparing Table 1 with Table 4, we find a direct relationship between long-term growth the depth/instability of the GIC at the regional level. The two most heavily affected areas, EU and NA, have been going through an evolutionary change from long wave upswing from the 1950s/60s to the 1970s to long wave downswing (possibly via borderline conditions) from the 1980s to the 2000s. This drop in the growth rate is directly linked to their becoming the most heavily affected areas in terms of the depth/instability of the Great Crisis: during 2009 and also 2008-10. The most heavily affected areas, these two especially, have moved from upswing to downswing, manifested in low rates of growth. These low rates of growth are linked to several institutional developments, mostly especially the (a) neoliberal trend of cutting productive government spending (Steve Pressman 2007), (b) dominance of finance over industry (Matias Binswanger 2009; Englebert Stockhammer and Lukas Grafl 2010), (c) relatively low rates of investment/GDP in the regime of accumulation (UNCTAD 2003), (d) maturation of the economy as the consumer durables Fordist system of production and distribution gave way to flexible and neo-Taylorist growth (Phillip Anthony O'Hara 2006), and (e) the inability to innovate in the Core to create sustainable systems of profit (Andrew Tylecote 2010).

The model of development for the most heavily affected areas relates to core industrial maturity and the inability to develop a new and innovative regime of accumulation (see O'Hara 2010). Areas will be subject to differential growth patterns according to their structural and dynamic place in the changing regime of accumulation. In brief, this represents a structurally declining rate of GDP growth per capita for the Core as they have an ineffectual ROA; mostly borderline or slightly higher growth for the semi-peripheral and peripheral areas of MENA, LACA, and SSA; and long wave upswing for Asia and some numerous nations in several other areas (e.g. Botswana, Egypt, Chile, Norway and Iran) (O'Hara 2012).

Central and Eastern Europe (generally) moved from long wave upswing during the 1950s-70s onto long wave downswing into the 1980s and 1990s, moving into very long wave downswing into the 1990s. Having experienced rapid privatisation, market growth and growing financial sophistication this area moved into dubious financial relationships which made them even more subject to instability than in the

Core proper (EU, NA). Much of the growth of the 2000s was in rebound from the massive dislocation of the 1990s; hence their institutions have been relatively unstable, with market relations—and corruption—often dominating industry as financial motives and oligarchies gain at the expense of long-term growth. Being subject to more potential instability than the Core proper they were thus more adversely affected by the crisis, at least in the critical year 2009; although they have rebounded strongly (as unstable systems often do) from the worst depths of the crisis to high growth in 2010. This youthful market energy is thus subjecting them to greater instability, although this 2010 and 2000-10 growth may indicate a greater potential to rebound than the Core of Western Europe and North America.

MENA and SSA were affected by the Great Crisis only moderately, since growth has moved from short and long wave downswing, respectively, into borderline performance, even going as far as *long wave* borderline in MENA. They have emerged from the crisis not too bad as growth was moderate while having *industry* dominate *finance* or at least a degree of dynamic balance between the two was the rule. Finance is not that sophisticated in these areas, especially SSA, so the degree of speculative bubble growth and crash was minimal or lacking altogether. Major financial innovations of a *avante gard* type, such as CDOs, MBS and sophisticated investment banks, were relatively lacking, and *relatively weak* networks associated with Core-nations' financial institutions were typical of these areas. Debt has moderate over the recent decade, especially in SSA, as during the late 1990s and early 2000s debt relief was instituted and the same type/degree of household debt on mortgages has not happened as occurred in the Core. Both these areas, MENA and SSA, emerged from the 2000s with some optimism, which perhaps stimulated (to some degree) the revolutionary movements in MENA to oust corrupt and long-standing strong-armed regimes, such as in Egypt, Syria, Libya, Yemen and Lebanon.

Areas much less affected by the Great Crisis were mostly in the periphery and semi-periphery. Semi-Peripheral areas such as China and many other areas of Asia (including especially South Asia such as India) have been undergoing Jumbo Long Wave Upswing over the past 60 years. Their growth has been impressive as growth actually rose in the area during the 1990s and 2000s, as the nations of this area mostly undergo a sustainable regime of accumulation. This regime of accumulation includes institutions associated with: (a) the mass movement of people from the countryside to the cities and urban areas; (b) a mass production labor-computer regime of accumulation promoting high profit and demand; (c) relatively low wages (compared to the Core) but gradually rising especially for the middle class; (d) a balance between finance and industry or perhaps with industry dominating finance; (e) a state system encouraging private enterprise and also productive state activities such as infrastructure, education, health and monetary/fiscal policy, as well as (f) a competitive system of trade and industry (O'Hara 2006a). In these areas, growth is high, profits for industry are sufficient and nowhere does finance dominate industry. As a result, long wave systemic risk is lower than other areas (at least in relation to these factors), speculative bubbles are less abundant, and financial-economic instability and crisis are less intense or lacking.

The principle link between the ROA, waves and financial conditions in this system of political economy is growth. This long wave and ROA approach starts by postulating that conditions of growth impact on the financial conditions of the economy. High and stable rates of GDP growth per capita, in this analysis, provide a basis for crucial fundamental values upon which the viability of the state and private sectors depend. As Christian Suter (1992) and Martin Wolfson (1994) have shown, long wave conditions of growth impact on the systemic risk of the system and nations. We follow a standard line of argument among long wave analysts, for instance, Suter (1992, p. 79) who found in his study that “low economic growth contributes to a high probability of debt-service problems”; not only in the debt crises of the periphery and semi-periphery of the 1980s and 1990s, but also in core economies where finance dominates industry through long wave downswing. Low growth, profits and investment share of GDP characterize the long wave downswing conditions currently impacting on major nations and regions - especially the EU and NA - plus the world as a whole. These long wave downswings increase the level of uncertainty in the economy, leading in the Periphery and Semi-Periphery, as well as the Core, to debt crises of varying severity. The low growth rates (of World Income) limit profit and investment, stimulating periodic financial crises and deep recessions. The debt crises were deep in the Periphery and Semi-Periphery, during the 1980s and 1990s; and they have been periodically quite deep also in the Core every decade or so, especially during the current Great International Crisis. Low growth increases debt burden by reducing both profit rates (through declining demand) and government budget surpluses (declining tax receipts).

The Core areas of Western Europe and North America were largely affected by the GIC because they were in long wave downswing where finance dominated industry, profit was relatively low and where no viable regime of accumulation has been emerging over recent decades. It was mostly the case with Eastern Europe as well; however, their evolutionary dynamics are somewhat different from the rest of Europe (and North America) because they are still in transition to a largely market system of economics, but still one where finance dominates industry and no viable regime of accumulation has yet emerged to propel long wave upswing; they currently are undergoing short wave upswing of an unstable nature. Instead of following the line of systemic risk of, say, the European Systemic Risk Board (2011), which concentrates on macroprudential risk (important though that is), or that of Oliver De Bandt and Philipp Hartmann (1998) who concentrate on shocks to the system, this current study, following other long wave research, looks to the workings of the regime of accumulation for evidence of a specific type of systemic risk: long wave systemic risk, LWSR. LWSR, we argue, is the *systemic* basis of much of the financial instability and crises of recent decades, including the GIC. We scrutinise this hypothesis empirically in the two sections that follow.

## 2. Long Wave Systemic Risk for Continents and Regions

This section outlines the relationship between the unstable dynamics of the World System and its regions and communities as it relates to the process of management of debt and risk. Over the short and long waves, growth in income per capita provides a

foundation for debt and risk, as growth of income changes in the long-term so too does the process of systemic risk. The principle of increasing risk shows that over the course of long waves certain institutional changes emerge. The boom in the short cycle leads usually to increasing debt and uncertainty which is of course linked to the process of changing from long wave upswing to downswing. In this context, we examine some data relating to this risk as it emerged through the 1990s and 2000s, culminating in the ongoing Great International Crisis of 2008-2012.

This section empirically develops an analysis of LWSR over the past decade, paying special attention to this in relation to the GIC in the recent context. Based on critically scrutinising the rate of growth of GDP per capita for all 228 nations included in the WDI database for 1990-2010, 2000-2010 and 2008-2010 periods, and associated continents and the World, we compare: (i) GDP growth per capita for the year 2009, with (ii) growth per capita for the years 2008-2010, and also with (iii) growth for the 2000-2010 period, and (iv) growth for the period 1990-2010 (in the context of the 1950-2010 wave). The reason for including these four time periods lies in the need to make an estimate of LWSR for the World, its major continents/regions, and also some selected nations.

We specifically link LWSR with the ability of the growth process to provide enough funds to finance debt and other resources for the future. We define LWSR in this context as the extent to which growth covers the need for these resources. Essentially we define LWSR as the extent to which (higher than average) growth is able to provide resources for citizens to utilise in whatever manner they choose collectively to do. These collective goods may very well be privatised for the benefit of its major classes, genders and cultures. LWSR as with income-sustaining systems require various collective goods for them to operate minimally.

Table 5, below, compares various continents or regions of the World vis-a-vis these four data sets relating to covered growth. The *concept of covered growth* is the extent to which growth has been sustained long enough to provide funds and for potential resources (including debt and the financing of debt burden; to sustain profit rate and government surpluses). In this we ascertain [1] the yearly growth for 2009 in basis points (BP), [2] cumulative 3-yearly growth for 2008-10 in BP, [3] the 11-year, 2000-10 AAGR, [4] the extent to which cumulative growth in 2008-10 covers growth in 2009, and the extent to which average annual growth 2000-10 covers cumulative growth in 2008-10, [5] the extent to which “[4]” growth coverage levels are sufficient, [6] the wave position during 1990-2010, and [7] an estimate for long wave systemic risk.

What this table shows is that the different areas have different levels of LWSR, defined as the *potential* of the growth to cover debt and employment. If average or cumulative growth is too low then existing debt and the additional debt caused by the low growth will enhance LWSR. If average or cumulative growth is high then the ability of growth to cover debt is high and therefore LWSR is low. We have proxied LWSR in this way to assess it for the World and the regions or continents. The findings are that, in the light of the Great International Crisis of 2009 and also 2008-2010 as a whole, as the main hypothesis indicated, LWSR is highest in the European Union and North America. This means that these regions are much more

likely to be involved in systemic crises in the light of debt problems and problems of low growth such as higher unemployment. LWSR is slightly higher in the EU than North America, suggesting a greater chance of systemic crisis in the EU.

**Table 5** Covered GDP Growth, Wave Position and Long Wave Systemic Risk, Basis Points of Growth, 2009, 2008-2010, 2000-2010, 1950-2010; World, Continents / Regions

	[1] Growth 2009 BP	[2] 3-Yearly cumulative growth 2008-10 BP	[3] 11 Year ann. av. growth 2000-10 BP	[4] Growth coverage BP: (a)2008-10 covers 2009, (b) 2000-10 covers 08-10	[5] Coverage adequate? (a) 2008-10 covers 09 (b) 2000-10 covers 08-10 (>50)	[6] Wave position, 1990s, 2000s	[7] LWSR High, 10.00-7.51; medium, 7.50-5.01 low, 5.00-2.51 very low, 2.50-0.00
EU	-463	-101	118	(a) -564, (b) 17	(a) No, (b) No	LWD	HIGH, 9.5
N.America	-353	-75	108	(a) -428, (b) 33	(a) No, (b) No	LWD	HIGH, 9.2
EE & CA	-468	-83	167	(a) -551, (b) 84	(a) No, (b) Yes	LWD, SWU	MEDIUM-HIGH, 8.7
World	-316	7	149	(a) -309, (b) 156	(a) No, (b) Yes	LWD	MEDIUM, 7.2
LACA	-291	175	235	(a) -116, (b) 410	(a) No, (b) Yes	LWD, B	MEDIUM, 6.8
SSA	-041	077	234	(a) 036, (b) 411	(a) No, (b) Yes	LWD, B	LOW MEDIUM, 6.0
MENA	39	123	242	(a) 84, (b) 365	(a) Yes, (b) Yes	B	LOW, 4.5
East Asia	-126	686	332	(a) 560, (b) 1018	(a) Yes, (b) Yes	LWU	LOW, 3.5
South Asia	661	328	531	(a) 989, (b) 859	(a) Yes, (b) Yes	LWU	VERY LOW, 1.5

Source: The author's original work; based around data from Table 2.

The *potential* for growth to cover debt - LWSR - is of a medium value in the World as a whole, plus Latin America and the Caribbean and also Eastern Europe and Central Asia. This indicates that a global crisis is perhaps not that likely, at least not yet, while systemic crisis is unlikely to develop in LACA and EE. However, if contagion does spread from the EU to North America it could easily affect LACA and also EE which are really regional-alliances of the EU and NA, respectively. Due to the interdependencies involved, this medium level of risk can easily rise in the face of systemic collapse of the core. LWSR can grow in a tipping point manner due to the contagious interdependencies between regions, especially LACA vis-a-vis North America and EE vis-a-vis the EU.

SSA emerges from the analysis with a "low medium" level of LWSR, which is a few notches below medium. This is because the SSA has emerged from twenty years of long wave downswing to a borderline position in between downswing and upswing. This represents an improvement in performance and hence a drop in LWSR. Perhaps surprisingly, MENA has dropped to a low level of LWSR into the 2010s, a few notches higher in risk than the even lower level for East Asia and especially South Asia. MENA has recovered somewhat from the short wave downswing of the 1980s through twenty years of long wave borderline performance during the 1990s-2000s. This is a substantial improvement and may well have contributed to the higher aspirations of social and political change emerging in the areas through the revolutions in Egypt, Syria, Libya, Yemen and some other nations in MENA.

Asia as a whole has a low level of LWSR as we move into the 2010s. Nations of South Asia, such as India, tend to have an even lower level of risk than many in East Asia, such as Malaysia. The Asian continent as a whole is undergoing the most rapid transformation into six decades of long wave upswing, with an expanded



growth into the 2000s as India expands higher. This greater performance reduces LWSR because the higher growth is also fairly durable and subject to lower levels of uncertainty than the other regions. This lower uncertainty translates into lower systemic risk, and hence very low potential for LWSR in Asia.

As Paul Davidson (2009) and many post-Keynesian institutionalists (PKIs) have argued, inadequate systems of demand and supply have led to periodic high levels of uncertainty (and visa versa) and precautionary demand for money, and low investment in the core plus the World as a whole. Non-ergodic systems lead to an environment of uncertainty where risk is incalculable. Yet some insights into uncertainty, specifically as a *form* of systemic risk, can be generated using data for World Income or especially GDP growth per capita. A sustainable or unsustainable regime of accumulation impacts on LWSR, which impacts back on growth levels in a bio-feedback manner. While the Core, as a result, has low levels of fundamental values, and hence high levels of LWSR, other areas as noted in this paper have more positive regimes of accumulation where systems of demand and supply stimulate income and wealth in the long-term. Such is especially the case with parts of Asia and numerous other nations in several continents.

However, as the LWSR for the World is medium, this indicates that a contagion moving from Europe to North America, and then into South America and Eastern Europe/Central Asia, could impact on other regions, especially the Middle East and North Africa plus possibly SSA and even Asia. The impact on Asia is likely to be moderate perhaps cutting short-term growth in half, which would likely still be in the vicinity of long wave upswing but at a lower level. A global crisis could emerge, which affects the continents to the degree that the regions experience LWSR. The Core is likely to be the most highly affected; followed by nations in Eastern Europe and LACA. Then if the crisis becomes protracted likely also MENA will be involved, and to a lesser degree SSA. Asia will likely be moderately affected without this becoming extreme. The likelihood of World long wave systemic risk rising to high levels due to tipping points will majorly affect those with high and also medium levels of LWSR.

### 3. Long Wave Systemic Risk in Europe, North America and Japan

Here we examine the *nations* least covered by growth to finance their debt levels. Special reference is given to LWSR in the European Union, North America, Eastern Europe and Japan. We assess the nations mostly affected by long wave systemic risk. This provides some context within which the current debt crisis in Europe and America is playing out, which nations are especially vulnerable (and which are not), and how deep the problem may be in these regions. We commence the analysis in the same way as the previous section, by calculating the covered growth for 2008 compared, respectively, with 2008-2010, 2000-2010, and 1990-2010 (linked to the 1950-2010 period). Table 6, below, sets out this data on growth coverage in comparable form:

**Table 6** Growth Coverage, Waves, and Systemic Risk, Worst Affected Nations Extent of 2009 Growth Covered by 2008-2010 Growth, 2008-2010 Growth Covered by 2000-2010 Growth (vis-à-vis LW Position)

Nation	2009 growth BP	2008-2010, cumulative growth BP	2000-2010, average annual growth BP	Growth coverage BP (a) 2008-10 covers 09, (b) 2000-10 covers 08-10	Coverage adequate? (a) 2008-10 covers 09, (b) 2000-10 covers 08-10 (>50)	Wave position 1990s, 2000s	Long wave systemic risk (high = 10.00- 7.51)
Iceland	-721	-347	123	(a) -1068, (b) -224	(a) No, (b) No	LWD	Ultra high, 9.8
Italy	-579	-235	3	(a) -814, (b) -232	(a) No, (b) No	LWD	Ultra high, 9.7
Latvia	-1755	-706	493	(a) -2461, (b) -213	(a) No, (b) No	SWD, SWU	Ultra high, 9.5
Ireland	-827	-495	159	(a) -1322, (b) -346	(a) No, (b) No	LWU, SWD	Ultra high, 9.5
UK	-550	-187	112	(a) -737, (b) -75	(a) No, (b) No	LWD	Very high, 9.2
Portugal	-259	-083	55	(a) -342, (b) -204	(a) No, (b) No	LWU, SWD	Very high, 9.1
Norway	-266	-129	90	(a) -395, (b) -39	(a) No, (b) No	LWU, SWD	Very high, 9.0
Estonia	-1387	-568	486	(a) -1955, (b) -80	(a) No, (b) No	SWD, SWU	Very high, 9.0
Japan	-618	-69	98	(a) -687, (b) 29	(a) No, (b) No	LWD	Med high, 8.7
USA	-350	-76	97	(a) -426, (b) 21	(a) No, (b) No	LWD	Med high, 8.5
Greece	-244	-235	246	(a) -479, (b) 11	(a) No, (b) No	SWD, B	Med high, 8.3
Lithuania	-1427	-294	508	(a) -1721, (b) 214	(a) No, (b) Yes	SWD, SWU	High lower, 7.9
Russia	-775	162	542	(a) -613, (b) 704	(a) No, (b) Yes	SWD, SWU	High lower, 7.7
Sweden	-614	-096	176	(a) -710, (b) 72	(a) No, (b) Yes	LWD	High lower, 7.6

Source: The author's original work; based around raw data of World Bank (2011).

In this model, there are thus three main factors determining the LWSR level for nations around the period 2008-12, namely, the coverage level for 2008-2010, the coverage level for 2000-2010, and the position of the nation in the wave situation over the past two decades (linked to the 60 year data). Based on these criteria, we have four groups of nations. At the top are those with the highest LWSR as determined by growth coverage, including Iceland, Italy, Latvia and Ireland. Based on their growth coverage, they have the highest level of LWSR at “ultra high”, and hence the greatest potential for systemic crisis into the near future; Iceland having moved into this environment during the subprime crisis itself and Italy recently. The second-tier include the UK, Portugal, Norway and Estonia, with LWSR rates of 9.0 - 9.2, which have the second-highest systemic risk at “very high”, and are therefore well primed for systemic crisis into the near future; Portugal has already moved into this environment. The group of nations with the third highest level of LWSR at “high” with rates of 8.3 - 8.7 systemic risk, are those fairly well-placed to move into systemic crisis in the near future, including Japan, US and Greece; in fact, Greece has already moved into that environment. Currently the whole of the EU seems to be going through a systemic crisis of low growth, high debt and intractable uncertainty that may become extreme and affect further areas of the region and World.

The US, it could be said, being the origin of the subprime crisis and the GIC, moved into systemic crisis during the subprime crisis itself in 2008-09, and arguably is still in systemic crisis; although very tentative signs of recovery have emerged in

the last few months. The fourth group of nations, including Lithuania, Russia and Sweden, have high-medium levels of systemic risk and are perhaps less likely to move autonomously into systemic crisis in the near future due to their relatively lower levels of systemic risk; although they could easily move into systemic crisis due to contagion as adverse reactions to developments in other parts of Europe.

#### 4. Conclusion

The purpose of this paper has been to analyse the relationship between the short and long-run growth performance of nations and continents and their susceptibility to high levels of long wave systemic risk and hence systemic crisis. We started with a detailed taxonomy of wave-position in the short and long-runs, and recognised that the World has been undergoing long wave downswing over the past 3 decades, as has the European Union and also over the past 2 decades North America and Japan. Eastern Europe moved from long wave downswing in the 1980s-90s to short wave upswing in the 2000s. Three areas, MENA, LACA, and SSA have moved from downswing into borderline conditions, LACA and SSA over the past decade and MENA over the past 2 decades; which indicates a considerable improvement in long-run conditions. Asia is the only continent having undergone Jumbo long wave upswing, over the past 60 years.

We then devised a “long wave systemic risk” apparatus based on the ability of the continents, regions and nations to utilise growth as a way of financing their debt levels and employment requirements. We found, in this context, that the continents with the highest LWSR were the European Union and North America, regions most affected by the subprime crisis and the GIC. It is therefore understandable that they were found to also have the highest rate of LWSR. The regions with a medium rate of growth over recent years and decades were moderately affected by the crisis, and had medium levels of LWSR, including South America, Sub-Saharan Africa and to a lesser degree the Middle East and North Africa. And the regions with the highest performance in terms of long wave upswing had the lowest level of LWSR and were relatively unaffected by the crisis, including especially East and South Asia.

This is the first time that a type of systemic risk and system-crisis has been specifically related to the position of continents, regions and nations in the short and long wave situations. We investigate the nature of systemic risk in a long-term growth context. The results indicate a good approximation of wave and performance to LWSR. Nations and regions need to be especially cognizant of the problems of building debt in an environment of low performance and hence high long wave systemic risk. No longer can we take only the short cycle upswing as a basis for determining financial positions and debt. Rather, we must look to long-run performance as a basis for long wave systemic risk and hence crisis likelihood. This is the main message of this paper. The inability of the Core to develop a viable regime of accumulation increases LWSR for them and the World, as parts of the periphery and semi-periphery undergo moderate long-term growth and hence middle levels of long wave systemic risk, and many parts of Asia plus numerous nations in different areas undergo a vibrant regime of accumulation and hence low levels of LWSR but without pushing the World sufficiently in a very positive direction over the past 30 years.

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