

Reverse engineering the European Union's integration: A work in progress

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Abstract

The European Union (EU) represents a major achievement at building an integrated zone of democratic and free markets across 27 existing countries in Europe. Spanning many treaties, beginning with the *European Coal and Steel Community* in 1951, the *Treaty of Rome* in 1957, including the *Merger Treaty of 1967* among three communities to form a single council, and ending with the with the *Lisbon Treaty*, signed in 2008, EU consolidation is more than just an association among 27 countries. However, the *Lisbon Treaty* was only signed by country leaders, and not ratified by the citizens in the Member states. The question arises just how much more than an association is the EU? Based on the social physics of mergers and acquisitions (M&A) for organizations, as a work-in-progress, we have analyzed the EU to conclude that at this time, the EU is a weakly integrated union that has the potential for much more integration.

Introduction

We propose to study social welfare as impacted by European integration from the perspective of social physics (Lawless, 2010), specifically, unionization (i.e., modeled by Mergers & Acquisitions,¹ or M&A) and fracturing processes (i.e., spin-offs and split

¹ Mergers can be used to fill in missing technologies, reduce transaction costs, etc., but they can also be transformative, which has occurred in the EU to reduce the chances for war between the two countries who

ups²). Compared to social physics, the advantage for traditional studies of social welfare is the availability of easy information in the form of self-reports from individuals (e.g., interviews, surveys, polls³). However, doubt exists whether or when self-reports are valid (Lawless et al., 2009): the literature indicates the common finding of a minimal correlation between self-reports and behavior, whether between managers and the performance of their firms (Bloom et al., 2007); self-esteem and academic or work performance (Baumeister et al., 2005); or between game theory preferences and actual choices made during games (Kelley, 1992). On the other hand, M&A activities provide exogenous information independent of, but in conjunction with, aggregated views from citizens about the social effects of integration on social welfare.⁴

We define the information flow through an organization or system as entropy flow reduced by coordination processes, blocking processes, and information rate losses (e.g., Conant, 1976). Mindful that organizations, industries, or systems exist to provide a function that aggregated individuals cannot (Coase, 1937; Ambrose, 2001), integration represents a minimum expenditure of information flow on coordination, blocking and

have been belligerents in two world wars: Germany and France; from *The European Union Overview*, CIA Documents, retrieved 2/28/10 from www.cia.gov.

² Not all mergers and acquisitions work as planned; e.g., from the *New York Times* (3/1/10), Kholberg, Kravis & Roberts (KKR) joined by the Texas Pacific Group, Goldman Sachs and other investors, paid \$48 billion in 2007 for TXU, which had reported a net profit of \$2 Billion in 2006. It was the largest private equity deal in history, with \$40 billion coming from investment bonds and \$8 billion from investors. The deal was predicated on the rising price of gas as an energy source. However, the buyout occurred at the top of the market for gas, which has plunged since the economic recession. Recently, with the owners scheduled to make a balloon payment of \$20 billion in 2014, and with the recession lingering, Moody's has threatened to downgrade the bonds. Retrieved 3/1/10 from nytimes.com.

³ For example, the general attitude in support of the euro among Europeans is 71% (Flash EB No. 251); in contrast, the public attitude in the UK toward the EU is 37% positive and 40% negative (Flash EB No. 274); retrieved 2/22/10 from Eurobarometer Standard ec.europa.eu/.

⁴ One possible criticism is the following: Why is our model a good one for EU integration? What kind of practical use does it have? One thing is to point out that survey data are problematic—thus pointing at the problem—and another thing is to point out at the solution, or something tangible. To counter this criticism, as we proceed, we will be more specific about the “social effects of integration” by providing examples on the social welfare of the union.

losses. For the EU, in general, its European Commission provides coordination, and its courts and other checks and balances produce blocking effects. On the relatively large scale of the EU, we plan to measure the results of integration initially as the level of social benefits provided on average to its citizens, EU competitiveness against other countries, and inversely to corruption across the EU. Regarding corruption in the EU, for example, Greece has been sued twice by the EU over its misleading, incorrect and poor data quality.⁵

Considering M&A and spin-off activity, we have found that sufficient integration leads to increased stability against common perturbations (in government, from military threats, assassination attempts, economic threats; or in business, from price wars, hostile M&A threats, or organizational fragmentation), or in times of acute crises (for the USA, the bombing of Pearl Harbor, the Great Depression, the 9/11 attacks on the US homeland; in business, from the 2007-9 recession's impact on Ford, Wal-mart and J.P. Morgan Chase).

European integration began with a common currency, reduction of trade barriers, and the freedom to migrate internally.⁶ Today, however, Europe, struggling to unify its economic zone, "finds it more difficult politically to move quickly on monetary policy and far more difficult to coordinate spending and regulatory systems." (Seib, 2010)

Throughout its history, economic harmonization in the EU has conflicted with the rights of its Member States. In terms of tax policy, the approach of the European

⁵ *Reuters* (2010, 1/12), The European Commission is likely to launch infringement proceedings against Greece for failing to provide reliable statistics on its budget deficit or debt; retrieved 2/22/10 from www.reuters.com. *New York Times* (2010, February 21), "Editorial: Modest won't do it." In the editorial, "Greece used a derivative swap arranged by Goldman Sachs to mask the true size of its public borrowing." Retrieved 2/22/10 from nytimes.com.

⁶ See eur-lex.europa.eu/en/treaties

Commission⁷ has been to address the concerns of individual citizens and businesses operating within its internal market by focusing on the elimination of tax obstacles to all forms of cross-border economic activity, in addition to continuing to fight against tax competition. While personal income taxes have not been a subject of economic harmonization, provided that the EU treaty's principles across four fundamental freedoms—free movement of workers, services, capital and establishment—are respected (Blass and Garcia, 2008), the harmonization of corporate taxes has fuelled many economic debates. Corporate tax harmonization, an early goal of the integrated European market, attempts to achieve economic growth for all of its Member states through establishing identical tax bases, rates, and systems. It has proven to be unattainable through the political and judicial provisions of the EU's treaties (Figura, 2002), particularly in the face of disparities⁸ among existing Member States, exacerbated by the addition of new, non-integrated Member states. Economic motivators for a low corporate tax implementation include the attraction of foreign direct investments, fighting unemployment, a success story for Ireland in the 1980s and 1990s, and more generally protection of a Member state's future economic development while retaining its sovereignty. Countries, like Germany and France, that have pushed for corporate rate harmonization in the form of an EU minimum corporate tax rate have to eventually lower their rates (Germany's current rate is 15%), after the proposed qualified majority voting

⁷ European Commission (2006) "The contribution of taxation and customs policies to the Lisbon strategy" (COM/2005/532 of 25 October 2005).

⁸ Before the acceptance of new member states on May 1, 2004, Germany with a 45% and Ireland with a 10% corporate tax rate constituted the most notable examples of the disparity (see Coleman, 2000). Among the 27 Member States, the most notable current disparity is Belgium with a rate of 33.99% and Bulgaria with a rate of 10%. (www.tax-consultants-international.com/read/worldwide_tax_rates).

(QMV) on domestic tax issues, was repeatedly blocked (i.e., by Ireland) through operation of the unanimity requirement in Article 100 of the EC Treaty.⁹

In contrast, insufficient integration leads to a loss of control during perturbations or crises (the Union of Soviet Socialist Republics [USSR] split apart as the result of government, political and financial instability (see Matlock, 1995; Gaidar & Boius, 2007);¹⁰ the Anglican Church is currently splitting apart from cultural and leadership challenges; and the revolt against union management's focus on political campaigns instead of organizing and recruiting new members led to the spin off of SEIU from AFL-CIO¹¹).

Merger activity is designed to increase stability (Lawless et al., 2009). In the case of the EU, it was launched ostensibly to reduce exchange costs with coal and steel by six countries but its overriding plan was to make war unthinkable among its Member states.¹² Perturbations, daily and improvised, test whether integration processes post merger have been effective. The present crisis in Greece, for example, is testing the EU's effectiveness as a union. In January 2010, Greece was successful with a bond sale but its success turned into a firestorm of criticism against EU regulators after Greece's bonds unexpectedly lost 3.5% days after the sale was completed. Now that Greece is again planning a new bond offering to raise additional funds in two forthcoming bond sales, it

⁹ The European Commission Nice Summit in 12/2000 attempted unsuccessfully to replace the Article 100 unanimity requirement with Qualified Majority Voting (QMV), under which the votes of Council members are weighted and "out of a total of eighty-seven, at least sixty-two votes" must be in favor of an act for it to pass (Figura, 2002). But where the EU failed in Nice and again with its constitution, it has succeeded with the *Treaty of Lisbon*.

¹⁰ Maybe the USSR split only demonstrates that economic crisis tends to disintegrate or destabilize, so the cause is economic incompetence, or instability, which disintegrates a union of states. Former Yugoslavia split due to ethnic and cultural differences. So disintegration of a union of states can occur for a variety or a complexity of reasons.

¹¹ From MSNBC (2005, July 25), members of the Teamsters and the Service Employees International Union split from the AFL-CIO union, retrieved 2/21/10 from www.msnbc.msn.com.

¹² CIA Documents (2002), *The European Union: An overview*; retrieved 2/28/10 from www.cia.gov.

will act as a referendum on the EU's political response to the crisis to "crystallize the situation" per J. Reid, Deutsch Bank AG Credit Strategist in London,¹³ Failure may lead to a direct intervention by the EU (likely to be led by Germany and France).¹⁴

The test of integration competence and its impact on social welfare for the EU is pressed by the 2007-09 recession on finances to the governments of Portugal, Ireland, and Spain, but more so by Greece.^{15,16} As an example of mergers among States designed in part to reduce transaction costs, in responding to Greece's indebtedness, the European Union bailout is an attempt to maneuver between the tension created in trying to avoid an increase in "moral hazard" by bailing out spendthrift governments, reducing the uncertainty in markets about the value of the EU, and getting indebted nations to execute their commitments to fiscal prudence.¹⁷ The tension between fiscal prudence and political pressure is reflected in the wild gyrations in the exchange value of the euro by market investors who think the EU's solution for Greece is inadequate and Greek citizens who reject their loss of sovereignty being imposed by the EU as too painful, presently being reflected by country-wide strikes that have slowed the Greek government's responses and created conflict with the EU and Greece over the adequacy of Greece's plan to reduce its deficit this year to 9% of GDP.

¹³ *Wall Street Journal* (2010, February 19), "Greece's next test is in a bond sale", pp. C1,3.

¹⁴ *Wall Street Journal* (2010, 2/28), "Greek bailout plan takes shape". As a last resort, Germany and France plan to help Greece pay off its debt maturing in Spring 2010.

¹⁵ Castle (2010). With austerity measures, Greece is attempting to bring its budget down from a deficit of 12.7% of GDP and an overall debt level of 113% of GDP. But if the Greek public doesn't accept the decisions of its politicians, it could lead to civil unrest in the form of strikes by unions to produce social gridlock, testing the will of politicians in Greece but also the EU. At the same time, Greece is being sued for the second time (the first time being in 2004) from failing to provide Eurostat, the EU statistical service, with accurate data. Greece represents about 2.5% of the EU's GDP.

¹⁶ From the *Wall Street Journal* (2010, February 4), "Greece, Portugal woes intensify" as the cost of insuring their debt increase, increasing the odds in the success of the EU rescue plan to reduce the threat instead has led to a market sell-off and the euro trading at a 7-month low.

¹⁷ From the *New York Times* (2/11/10) "Europe promises 'coordinated action' to help Greece", retrieved 2/11/10 from nytimes.com.

As our theory predicts (Lawless et al., 2009), fragmentation in integration should slow the execution of a plan: After already having postponed its bond sale for a week, and "Amid the jittery markets, some Greek officials are worried that the bond might fail to attract enough investor interest."¹⁸ In this situation, two things are important from a theoretical perspective: first, as we will discuss in more detail below, the existence of Nash equilibria in a free society implies that the processing of information slows action in the execution of a plan; and second, success is determined by the number of supporters attracted to a position or product.

The EU's vision: The EU *Lisbon Treaty* is designed to "promote economic, social and territorial cohesion, and solidarity among Member states."¹⁹ And "The Union shall establish an economic and monetary union whose currency is the euro."

The EU vision appears to be increased harmony (Saving, 2005) from the leveling of taxation and labor rates among Member states,²⁰ but harmonization may reduce a state's power to self-organize to solve its own problems. European Commission leaders have conceded that "tax levels are a matter for national budgets, and national budgets are an essential part of national sovereignty."²¹ Even though expressly permitted by the *Treaty of Lisbon*,²² harmonization may dampen the number of experiments conducted by individual EU states (e.g., compared to State's rights in the USA). The end result could lead to an increased central bureaucracy in Brussels to ensure harmonization but also less

¹⁸ *Wall Street Journal* (2010, 2/27) "Showdown in Athens", retrieved 2/27/10 from wsj.com.

¹⁹ See eur-lex.europa.eu/en/treaties.

²⁰ However, even though "indirect taxes are harmonised at EU level, there is substantial variation in the amount of revenues raised from consumption taxes" (Eurostat, 2008, p. 49).

²¹ Norman, Peter (2000, Nov. 16) "Prodi Asks for End to National Vetoes," *Financial Times*, pg. 14.

²² See eur-lex.europa.eu/en/treaties, from 9.c., "Under the principle of conferral, the Union competencies shall act only within the limits of the competencies conferred upon it by the Member states in the Treaties to obtain the objectives set out therein. Competencies not conferred upon the Union in the Treaties remain with the Member states."

evolution, stagnation, gridlock (WP, 2001), and an increase in the number of threats of financial collapse. While bureaucracy increases system-wide complexity, it also increases fragmentation by transferring some of the responsibility for unionization to bureaucrats, weakening the EU's unifying vision in support of democracy and free markets.

Further, increased bureaucracy across a system leads to the reduction of political accountability and responsibility, producing an endless or "frictionless" oscillation.^{23,24,25,26} These oscillations simulate what often happens under autocracies governed by consensus and why decision making can appear to be interminable; a similar problem occurred a decade ago in the EU which led it to embark on drafting a constitution because "The requirement for consensus in the European Council often holds policy-making hostage to national interests in areas which Council could and should decide by a qualified majority." (WP, 2001, p. 29) But the constitution failed. Yet, even though constitution failed to be adopted, the new *Treaty of Lisbon* provides room to maneuver around consensus: From Article 9B, "Except where the Treaties provide otherwise, decisions of the European Council shall be taken by consensus." However, from Article 9C, "The Council shall act by a qualified majority except where the Treaties provide otherwise."²⁷

²³ Electricity in Venezuela: Sugget (2008) reported that following 391 unplanned outages in 2008 and after a blackout caused by a power outage at the Guri dam and a promise of 42 new hydroelectricity plants last April, President H. Chavez, with the help of Cuba, plans to build 21 electricity generators to reduce Venezuela's dependence on hydropower. Shortage is estimated at 1-2 GW. Per Chavez, "We have firmly, seriously, and profoundly begun the gas revolution." Meanwhile Chavez agreed to import electricity from Colombia, which has a 4.5 GW surplus.

²⁴ On January 31, 2010, President H. Chavez announced \$1 billion to strengthen the national electricity system following months of blackouts caused by drought, increased consumption, and bureaucracy (retrieved 2/21/10 from www.stillmanexchange.com).

²⁵ BBC (2010), Electricity Minister A. Rodriguez announced that the Venezuelan government would begin to ration electricity by using 4-hour rolling blackouts during each week.

²⁶ Sugget (2010) reported that the Minister of Electricity, A. Rodriguz, resigned at the request of President Chavez and the rationing program was suspended.

²⁷ eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2007:306:0010:0041:EN:PDF

One of the striking differences between American states and European states is that European states have had much more historical and cultural differences, which have diversified their institutional frameworks in their state building, compared to the young American states, built primarily by the same European colonies that set up similar institutions to enforce the rule of law and encourage investment (see Acemoglu et al., 2001). The great European diversity in historical and culture based values, combined by a comparative lack of land and multiple open fights among European states compared to American states poses the greatest cultural challenges for an integration process.

Theory

Collecting information from well-defined organizations for social network analysis (SNA) is relatively straightforward. For "Dark" social networks (DSNs), comprised of gangs or terrorists (Carley, 2006), uncovering information to compute an SNA is orders of magnitude more difficult. But even when the information is readily available, the signals collected from social networks have not led to valid predictions about their actions or stability (NRC, 2009; Schweitzer et al., 2009). This failure has led to a wide request for new social theory to better understand the effects of interdependence in social networks and in social organizations (Jasny et al., 2009; NRC, 2009). For example, Barabási (2009) concluded that room needs to be made for a new theory "to understand the behavior of the systems ... [and] the dynamics of the processes ... [to] form the foundation of a theory of complexity" (p. 413).

Traditional social and game theories, known collectively as methodological individualism, have been used to study interdependence for decades. Game theory was

one of the first to model interdependence rationally and to solve it in the laboratory for two sets of non-cooperative opponents. These "toy" problem solutions are known as Nash Equilibria, which Luce and Raiffa (1967) believed resulted in unfair distributions of a game's resources among its participants. Axlerod (1984) concluded that the unfair distributions from "the pursuit of self-interest" (p. 7) in games could be controlled with punishment sufficient to promote the evolution of cooperation. But Luce and Raiffa (1967) warned that it was unlikely that "any sociology be derived from the single assumption of individual rationality" (p. 196). Indeed, outside of the laboratory, game theory has not been validated (Sanfey, 2007) nor has it produced satisfactory solutions (Schweitzer et al., 2009). One problem with Nash equilibria is that they have been conceived as 2-D solutions of games between opponents that largely overlook their social effect on the population, which would make it a 3-D problem and more realistic. We offer a new theory for interdependence set in 3-D.

In our new theory, Nash equilibria become a valuable asset to a society. Instead of harmonization reducing the contrast between states to decrease fragmentation processes, Nash equilibria act as points of conflict that process information by driving a public's attention back and forth as a conflict is driven across time by self-interests, generating a model of a social-psychological harmonic oscillator (SPHO). Based on findings from the literature, SPHO (moderated conflict, competition) situations serve to improve learning (Dietz et al., 2003), political processes (Coleman, 2003), decision-making in the courtroom (Freer & Purdue, 1996), environmental cleanup decisions (Lawless et al., 2009), and, we postulate, improving social and political integration. SPHOs best disambiguate solution paths for robots (Bongard et al., 2006). Not considered at this time

is that the SPHOs generated by Nash equilibria serve to increase integration. In contrast, the absence of SPHO oscillators indicates a consensus-driven minority rule such as a dictatorship (Kirk, 2003), which significantly reduces social welfare (Hayek, 1944). That consensus-seeking is driven by a minority wishing to control a system was recognized early on by the EU (e.g., WP, 2001). Further, the oscillations from an SPHO generate fluctuations that produce information characteristic of an organization's or system's stability response (e.g., the financial ordeal of Greece today produces more revealing and reliable information about the status of Greece than the statistical data it provided to the EU, which turned out to be misleading-see footnote 5). This characteristic information forms the central part of our model of the conservation of information (COI).

Organizations, systems and perfection. Individuals are not competent at multi-tasking (Wickens, 1992). In contrast, an organization or system is able to multi-task to provide a benefit that an uncoordinated aggregation of the same individuals constituting the organization cannot perform (Ambrose, 2001). A successful organization increases social welfare (e.g., jobs and profit; Coase, 1937). Conant and Ashby (1970) proved that no organization can achieve perfection by trial and error, but they hypothesized that an algorithm exists to run an organization perfectly. Conant (1976) established that when an algorithm solves a problem perfectly, no entropy (information) is generated. By implication, a perfectly run organization is dark not only to outsiders, but also to itself.

We have postulated that information forms a Gaussian distribution that is coupled to its Fourier transform as a multiplicative Fourier pair that ideally equals a constant, producing COI. We have identified four sets of Fourier pairs that describe interdependence in organizations. First, larger organizations and systems are more stable

(lower stock market volatility) or "darker" than smaller ones, a motivation for organizations and systems, like the EU, to grow in size organically or with mergers and acquisitions (Andrade et al., 2001). Second, even for well-known organizations and systems, the more skilled they become, the "darker" should become their signals to observers and to themselves (Landers & Pirrolo, 1990); this effect increases the demand for the physical markers provided by social physics than self-reports (Lawless et al., 2009). Why is EU a dark social network? As an organization or system becomes skilled and successful, less information is generated to outsiders and itself (Conant & Ashby, 1970), including information about what makes it successful; when it is no longer as successful, questions begin to be raised about whether it can survive, as is the case for the EU today.

Third, and another reason for social physics, as certainty in one factor grows, uncertainty in its Fourier paired cofactor grows, creating orthogonal, conjugate variables. Illustrating this point for self-reported and interview data, the meta-analysis by Baumeister and his colleagues (2005) found that self-esteem, arguably one of the most studied phenomena in psychology, was negligibly correlated to academic and work performance. We postulate that this holds for organizations and systems. Fourth, the more focused an organization's operational center-of-gravity, the more able it is to replicate its business model or plan geospatially (Lawless et al., 2009). Thus, the intent behind harmonization, while laudable, should be replaced instead with a "unionization" like the USA that permits harmonization at the EU level (e.g., foreign policy, mutual defense) and sovereignty at the state level to encourage experiments in self-organization.

By studying the fluctuations that an organization or system experiences daily across these four pairs of interdependent cofactors, COI suggests that it is possible to reverse engineer an organization or system, including a large and dark social network like the EU or locally like a street gang, from the information that is produced in its responses to perturbations. But to complete our theory, we need in addition a mechanism to measure social welfare from a methodologically social perspective. For that we use Lotka-Volterra type equations to produce 3-D limit cycles (May, 1973). We plan to finalize an overview of the theory; comparative results between EU, USA, and China; and the questions the theory and the results raise.

Analysis

As a work-in-progress, we did not go beyond perceptions at this time, precluding us from considering the limits of self-reports. The problem with perceptions is their potential disconnect, say, between justifications and actions (per Tversky, in Shafir & LeBoeuf, 2002). For example, in Greece, a country where tax evasion and corruption is reportedly widespread,²⁸ despite being challenged by strikes after a first round of cuts and being pushed by the EU (Germany and France), Greece's Prime Minister G. Papandrea said "The new measures were not a choice but a necessity to save Greece from the clutches of speculators ..."²⁹ Instead, we considered what the aggregated perceptions should be based on our theoretical predictions.

Mindful of this distinction, guided by theory, our first prediction is that a well-integrated system is more competitive and less reliant on corruption (e.g., the Corruption

²⁸ Greece is ranked 71st on the CPI (for more, see footnote 29), with a score of 3.8.

²⁹ *New York Times* (3/3/10) "Greece approves plan for new taxes and pay-cuts".

Perceptions Index,³⁰ or CPI). Based on the data in Table 1, we have analyzed the relationship between CPI and national competitiveness³¹ to find a strong correlation of 0.69 that supports our prediction that as competition increases, corruption decreases. Our second prediction is that the free flow of information, measured by the Freedom Index,³² should lead to a lower loss of life during national emergencies. For that contrast, we compared the estimated loss of life from earthquakes in Haiti (2010), Chile (1960 and 2010) and San Francisco (1989). Against the backdrop of a weak correlation as expected between governance type and major earthquakes ($r=-0.11$), we found a strong correlation between a country's competitiveness and the number of quake deaths ($r=-0.94$). Finally, we used the United Nation's Human Development Index (HDI³³) as a measure of social welfare (e.g., the HDI rankings were: USA 13; Chile 44; Haiti 149; China 92; the EU averaged 29.04 across all of its 27 countries).³⁴ We found that low levels of CPI were perfectly and inversely associated with the freedom index ($r=-.99$) and the HDI ($r=-.99$), indicating that corruption is reduced significantly with the free flow of information and the maximum development of citizens. We also found that competitiveness was strongly and inversely related to the freedom index ($r=-.66$) and HDI ($r=-.61$), indicating that competitiveness is integral to freedom and citizenry. Finally we found that the freedom index and HDI were perfectly related ($r=.99$), indicating that it's not possible to fully develop human capital when freedom is not available (e.g., the HDI ranking for Cuba at

³⁰ transparency.org/policy_research/surveys_indices/cpi/2009/cpi_2009_table; the number for the EU is based on an average of its Member states (standard deviation 1.79).

³¹ from www.weforum.org/en/initiatives/gcp/Global%20Competitiveness%20Report/index.htm.

³² www.heritage.org/index.

³³ hdr.undp.org/en/.

³⁴ HDI scores retrieved 3/1/10 from hdr.undp.org/en/media/HDR_2009_EN_Indicators.pdf.

51 puts it in the second tier or high human development category, running from 39-83, but Cuba's ranking on the Freedom Index is a very weak 177).

We contrasted the USA and EU because the USA's economy is fully integrated; and the EU and China because China is culturally integrated. Also, the USA is a full democracy and republic with functioning checks and balances, which the EU is working to achieve and which China is working to avoid. We considered the emergencies experienced by Haiti and Chile as convenience samples.

Table 1. Preliminary country comparisons (primary source: CIA Worldbook, data from July 2009, retrieved 2/4/10 from www.cia.gov)

Factor	USA	EU	China
Irrigate land, sq km	223,850	168,050	545,960
Population, millions	307	491.6	1,338.6
Population, growth rate, %	0.997	0.11	0.655
Births/1,000	13.83	9.9	14
Deaths/1,000	8.38	9.9	7.06
Migration rate/1,000	4.32	1.46	-.39
GDP, Trillion \$, 2009	14.25	14.5	8.77
Schooling, in years, average	16	NA	11
Literacy, %	99	NA***	90.9
Fresh water per capita, cu m/yr	1,600	NA****	415
GDP, per capita, \$	46,900	32,700	6,500
Labor Force, millions	154.5	224.8	812.7
Unemployment rate, %, 2009	9.4	9.4	4.3
Gini Index	45	31	41.5
Investment rate, %	12.5	19.7	42.6
Debt, % GDP	39.7	NA**	18.2
Market Value	NA*	15.6	2.79

Stocks, \$ Trillion			
Electricity generation, Trillion kWhr	4.11	3.04	3.45
Corruption Perceptions Index	7.5	6.35	3.6
Competitiveness ^{35,36}	5.5	4.69	4.74
Freedom Index	8	41.67	140
HDI	13	29.04	92

*estimated to be less than 20. ** Estimated 30,393 in 2008. *** Rated high by UN (at 98.5% in 1995). **** Estimated at 1,000 cu m/capita/yr in 2008 by Eurostat.

³⁷

Conclusion:

Although a work-in-progress, we found support for our theory of conservation of information (COI) from several angles. An increase in freedom promotes the competitiveness of a nation and the development of its human capital. Conversely, fully developed social capital makes a nation more capable of preparing for and responding to national emergencies. Competition builds wealth and promotes integration. Overall, for the EU, we have found that it is doing better than China for its citizens, but not as well as the completely integrated USA does for its citizens.

As a final note, the usefulness, odds of survival and domestic and international economic distortions³⁸ of corporate taxation have been widely debated in the literature

³⁵ www.weforum.org/en/initiatives/gcp/Global%20Competitiveness%20Report/index.htm; the number for the EU is based on an average of its Member states (standard deviation 0.491).

³⁶ *New York Times* (2010, 2/27) "China's industrial heart facing acute shortage of factory workers". The situation in China indicates systemic pressures that may increase inflation: "China has drained its once vast reserves of unemployed workers in rural areas and is running out of fresh workers for its factories." The current system "is not stable, is not healthy" said H. Donfang, Director of the China Labor Bulletin in Hong Kong. Retrieved 2/27/10 from nytimes.com.

³⁷ *New York Times* (2010, 2/28; updated on 3/3) indicated that the quake in Chile was located 200 miles Southwest of Santiago, nearer to Concepcion with 200,000 residents. At least 799 deaths have been reported; while the toll is expected to rise, it is also expected to be far fewer than the 230,000 counted so far for Haiti because the construction in Chile follows stricter building codes. In 1960, a 9.5 magnitude earthquake in Chile killed about 2,000. Averaging these two together gives about 1,400 deaths.

³⁸ Sources of economic distortions include: income shifting between capital and labor, profit shifting across jurisdictions, and the effects of taxation on business location and FDI.

(see Nicodème, 2009). Corporate tax harmonization in the EU and its effects on the social welfare of member states has also been debated. From the perspective of our COI model, we are interested in investigating whether the increasing economic interdependence and diversity within Europe will, as expected, increase political competition from qualified majority voting (QMV) on European Union initiatives prescribing domestic tax base and tax rate, rather than consensus or unanimity which is susceptible to corruption and minority control (WP, 2001). If QMV were to replace the unanimity requirement on tax issues, the widely debatable European Union minimum corporate tax rate—with several positive implications for the EU social welfare—would likely pass.

Lastly, we have postponed a discussion on the contribution of neutrals to the decision-making process, especially in large social systems, by moderating the adverse effects of (political) competition (Kirk, 2003) and by promoting compromises (Schlesinger, 1949), thought to be the key missing ingredient in starting the European wars of last century.

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