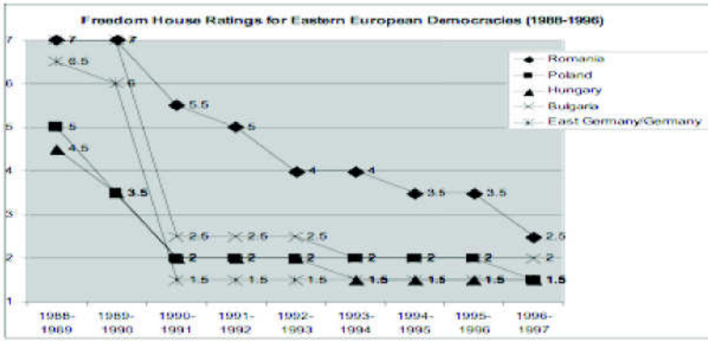

Fig. 1: Freedom House scores for new democracies in Eastern Europe (1988-1997)

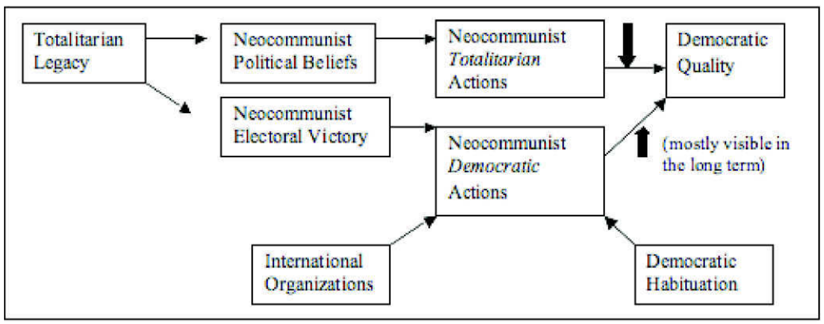

Fig. 2: Romanian democratic quality in transition

Sebastian Burduja is a junior at Stanford University, majoring in Political Science and Economics. From an early age, he developed a passion for Romanian politics and became interested in researching the country's postcommunist democratic consolidation. Within Stanford's vibrant academic community, Sebastian had access to the most prominent sources evaluating Romania's transition to democracy. More importantly, he benefited from the inestimable support and mentorship of leading scholars in the field of democratic consolidation. With respect to his future plans, Sebastian expresses a firm commitment toward contributing to Romania's democratic consolidation after the completion of his undergraduate and graduate education. Mentors: Professor Larry J. Diamond, Professor, Professor Anupma L. Kulkarni

Patenting and the Varying Enforcement of Covenants Not to Compete: A Comparative Analysis of Silicon Valley and Route 128

Jon Casto, Stanford University

Within Silicon Valley's external economies of scale, skilled employees move rapidly between competing firms. Literature attributes this dynamic to the entrepreneurial culture that took root in Silicon Valley in the 1950's, beginning with the "Grandfather" of Silicon Valley, Fairchild Semiconductor. Recently, scholars are paying attention to the role the enforcement of covenants not to compete play in dictating employee mobility within external economies of scale – and subsequently culture. For instance, in Massachusetts, employers can invoke covenants not to compete to reduce employee mobility and the associated costs that firms bear through employee flight. Conversely, under California law, such covenants are effectively impossible to enforce.

Defying the conventional wisdom behind intellectual property regimes, Silicon Valley's success is an intriguing instance in which limiting a firm's control over its human capital and subsequent intellectual property may ultimately encourage innovative activity. The paper seeks to discern a relationship between varying enforcement of non-competes and patenting, predicting a negative relationship in which invalidated covenants not to compete result in higher patenting rates. Ultimately, the data analyzed is congruent with this prediction, but because of the limited scope of the statistical analysis, the results cannot conclusively discern the nature of the relationship or the degree of true innovation versus patenting.

"Except as provided in this chapter, every contract by which anyone is restrained from engaging in a lawful profession, trade, or business of any kind is to that extent void."

California Business and Professions Code Statute 16600

"To this day, a poster of the Fairchild [Semiconductor] family tree, showing the corporate genealogy of the scores of Fairchild spin offs, hangs on the walls of many Silicon Valley firms. This picture has come to symbolize the complex mix of social solidarity and individualistic competition that emerged in the Valley. The tree traces the common ancestry of the regions semiconductor industry… The importance of these overlapping, quasi-familial ties is reflected in continuing references, more than three decades later, to the 'fathers' (or 'grandfathers') of Silicon Valley and their offspring, the 'Fairchildren.'"

AnnaLee Saxenian, Regional Advantage: Culture and Competition in Silicon Valley and Route 128

History demonstrates that the numerous factors determining which paths technologically innovative industrial clusters follow often fall into place serendipitously. Paul Krugman notes, "given a slightly different sequence of events, Silicon Valley might have been in Los Angeles, Massachusetts, or even Oxfordshire."[1] Not surprisingly, advantageous circumstances rather than carefully premeditated policy can determine the success of innovative activity despite the importance society places on the institutionalized intellectual property (IP) regimes, which are credited for delivering incredible prosperity. By better grasping the different forces at play in the differing contexts in which technology clusters arise, policymakers can better understand the role fundamental IP regimes play, specifically patenting.

Can the above California Statue enacted in 1872, nullifying covenants not to compete between employees and employers, explain the industry churn that distinguishes Silicon Valley in the 21st century from the more institutionally rigid Route 128 cluster in Boston? Or rather, are less tangible cultural forces responsible for Silicon Valley's dynamism with their resulting "overlapping, quasi-familial ties" that Saxenian details above? Evidence shows that the relative inability of firms to limit knowledge spillovers by former employees through covenants not to compete has led to a high degree of new firm creation relative to firm creation under strictly enforced covenants.[2] The importance of Silicon Valley's laidback, job-hopping culture should certainly not be discounted, but it ought not necessarily be attributed to chance considering it is likely a product of Statute 16600. Stanford Law Professor Ronald Gilson notes,

"Coupled with the limited usefulness of trade secret law in California as elsewhere, Silicon Valley employers' early efforts to prevent employees leaving to compete with employers' proprietary tacit knowledge failed. Employees learned that they could leave; employers learned that they could not prevent high velocity employment and the resulting knowledge spillover. And that legal infrastructure caused employers, however reluctantly, to adopt a different strategy, one of cooperation and competition..."[3]

Alone, cultural explanations are incomplete accounts of economic institutions' characteristics. The tremendous success of Silicon Valley's more entrepreneurial culture and norms should theoretically provide a model for Route 128 to emulate. The later decades of the 20th century provided sufficient time for Route 128 to evolve after the risk and rewards of entrepreneurship were legitimized by the likes of Steve Jobs with Apple and Robert Noyce with Fairchild and Intel. Too much revenue is at stake not to adapt! The varying enforcement of covenants not to compete may provide greater insight into the concrete differences that distinguish Route 128 and Silicon Valley.

Defying the conventional wisdom behind intellectual property regimes, this phenomenon is intriguing because it demonstrates in Silicon Valley's success an instance in which limiting a firm's control over its intellectual (human) capital and subsequent intellectual property may ultimately encourage innovative activity. Moreover, the positive externalities associated with agglomeration appear to outweigh the potential dangers of invalid covenants, evidenced by the lack of R&D flight away from Silicon Valley.

The current scholarship analyzing

the varying enforcement of covenants not to compete is understandably occupied with better understanding a relationship between employee mobility and the degree of enforcement, the necessary causal link lending any significance to the issue of patenting. Questions still loom about the nature of the link, specifically under what other conditions it manifests itself. For instance, Fallick, et al. find an effect in certain California industrial clusters but not statewide despite the universality of Statue 1660 in California.[4] The founding of Fairchild Semiconductor dramatically illustrates the importance of understanding the implications surrounding covenants not to compete, because those that begat Fairchild Semiconductor and its offspring (continuing the genealogical analogy) were infamously labeled the "Traitorous Eight" when they left the Shockly Transistor Corporation in 1957.[5]

This paper is concerned not with exploring questions surrounding the causal effect of covenants not to compete on employee mobility rates within a geographic region[6] but rather the impact varying enforcement of covenants has on patenting and IP protection. Do firms patent more without the aid of covenants not to compete? More importantly – and beyond the scope of this paper to conclusively answer – does an effect on patenting indicate increased innovative activity or rather represent increasingly defensive strategies under greater openness, employee flight, and inter-firm dependence?

If weak covenants in fact increase patenting rates, two very different policy implications arise. First, lower quality patents may unnecessarily flood the patent system in the absence of enforceable covenants, empowering "patent trolls" and granting greater monopoly power to firms than is intended by the underlying philosophy of the patent system. Second, if patents can maintain firms' incentives to innovate despite the absence of covenants not to compete, then policy makers might consider eliminating such covenants all together to capture the associated positive externalities from increased innovation, arising out of higher employee mobility and the subsequent "cross-pollination" among firms.

Hypothesis and Theory

This paper hypothesizes that high-technology industrial clusters (i.e. Silicon Valley, Route 128) in states that weakly enforce covenants not to compete will experience higher patenting rates per capita than high-technology industrial clusters in states where such covenants are strictly enforced. Without the legal infrastructure to enforce covenants not to compete and the subsequent employee mobility, technology clusters will be characterized by increased patenting at established firms to hedge against the increased risk of losing intellectual property to competitors and new rivals. Moreover, fledgling start-ups with only a patent portfolio to defend themselves in the competitive marketplace will be more numerous under greater employee mobility. In juxtaposition to the defensive patenting hypothesis, increased patenting rates may be a product of forced cooperation and its resulting innovative activity.

In testing this hypothesis, Massachusetts and California law will serve as the independent variables. In court, the interpretation of Massachusetts' legal code always upholds covenants not to compete. In ten decisions on preliminary injunctions to enforce covenants not to compete between February 1994 and July 1996, injunctions were granted in eight.[7] California's adoption of English common law, like Massachusetts, in 1850 did not set similar precedents. California courts consistently interpret Statute 166000 literally, nullifying covenants not to compete. Clearly, no endogeneity issues complicate the use California and Massachusetts law as the independent variable, bearing in mind that the pertinent legal codes and precedents were established well before the Silicon Valley and Route 128 technology clusters were ever conceivable.

Per capita utility patenting ratios from 1995-1999 in Boston's Route 128 metropolitan area (Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH NECMA) and California's Silicon Valley metropolitan area (San Jose, CA PMSA; San Francisco, CA PMSA; Oakland, CA PMSA and Santa Cruz-Watsonville, CA PMSA) derived from United States Patent Office (USPTO) and United States Census Bureau data serve as the dependent variable. The dependent variable is consistent with Saxenian's geographic boundaries of both Silicon Valley and Route 128.[8] Lastly, in addition to patenting rates for all utility patents, this study examines patenting ratios in the top fourteen biotech patent classes because of the particular insight the biotech industry can provide.

Before delving into the strengths and weaknesses of the data, it is important to understand the logic that underpins this paper's hypothesis as well as the significance in comparing per capita utility patenting ratios – and biotech patenting ratios – between Silicon Valley and Route 128.

Sophisticated regression analysis beyond the scope of this paper is needed to conclusively answer many of the questions surrounding a connection between the enforcement of covenants not to compete and patenting, taking into account factors like firm or industry specific employee turnover rates over time and how different size firms patent. In light of these constraints, this paper's analysis rests on the complimentary arguments of several scholars, notably AnnaLee Saxenian, Ronald J. Gilson, and Olav Sorenson. It is imperative that their arguments are compelling in order to empower this paper to figuratively connect the dots rather than literally.

In her book *Regional Advantage: Culture and Competition in Silicon Valley and Route 128,* Saxenian offers an extensive comparison of Silicon Valley and Route 128, arguing that Silicon Valley's high degree of employee mobility and firm specialization – derived from the region's unique cultural norms – is responsible for Silicon Valley's relative success in contrast to Route 128's vertically integrated paradigm. Furthermore, in a key article, Stanford Law Professor Gilson explicitly roots Saxenian's Silicon Valley culture to the lack of enforcement of covenants not to compete and distinguishes Route 128's agglomeration economy against Silicon Valley's "second stage" agglomeration economy, which can more easily reset its innovation cycle.[9] And finally, Fallick, Fleischman, Rebitzer, and Sorenson corroborate Gilson's hypothesizing with economic analysis, finding that a lack of covenant not to compete enforcement results in greater employee mobility in information technology (IT) clusters and higher rates of new venture formation, respectively.[10]

Though not widely accredited with influencing Silicon Valley's and Route 128's development like universities, venture capitalists and defense spending are, the legal infrastructure dictating covenants not to compete can logically play a tremendous role how these industrial clusters develop by virtue of their external economies of scale – with their pooled skilled labor – in addition to their industries' high dependence on IP, and implicitly, their skilled workforce. It is completely rational for firms to be concerned what their employees do with their tacit knowledge – hence the existence of covenants not to compete to begin with. Founders of successful, disruptive new ventures are not born with insight into markets and new technologies. Therefore, it is valid to consider how firms react in light of loosing control over their most valuable asset, their human capital. In the same vein, patenting seems like a logical reactionary measure under increased employee mobility, competition, and firm interdependence. To the extent that it can, this paper's data analysis confirms higher per-capita patenting rates for both utility and biotech patents in Silicon Valley than Route 128.

An Ideal Natural Experiment

Silicon Valley and Route 128 provide an attractive natural experiment, serendipitously borne out of an 1872 California Statute, to test this paper's hypothesis. Together, both are leading technology R&D external economies of scale supported by prominent research universities and venture capital firms. Each cluster's legal code, however, has taken a divergent approach regarding the efficacy of covenants not to compete, allowing academics to better discern the implications of such covenants.[11] California all but abolishes covenants not to compete while Massachusetts vigorously defends employers' trade secrets.

Adding to Gilson's and Saxenian's comparison of Route 128 and Silicon Valley, this paper's analysis of biotech patenting ratios in Route 128 and Silicon Valley offers new insight into the impact covenants not to complete have on patenting. The origins of the biotechnology industry are independent of the founding of Silicon Valley and Route 128, which is not true for those regions' core IT industries. World War II and early Cold War spending can account for much of the IT industry's growth – and subsequent institutional dynamics – in the critical decades of the 1950s and 1960s.[12] The modern biotechnology industry in the San Francisco Bay Area, compared to the IT industry, has more organic roots in the 1973 work of UCSF Chemist Herb Boyer, Stanford geneticist Stanley Cohen and Stanford biochemist Paul Berg who isolated many of the genetic engineering methods used in the biotechnology industry.[13] In an anecdotal example of different industrial origins, Genentech launched its first product Protropin growth hormone for children with growth hormone deficiency in 1983 whereas a young Fairchild Semiconductor's sales were predominantly to the military.[14]

Along similar lines, Saxenian's all-important Silicon Valley IT culture does not necessarily need to penetrate the biotechnology industry, which developed independently of the IT industry within the region's universities. Genetech and its peers fit nowhere in the incestuous Fairchild Semiconductor family tree. Despite the highly technical nature of their work, biochemists and electrical engineers have little utility in interweaving networks and frequenting the same Mountain View haunts to collaborate. Sorenson, et al. corroborates biotech's significance, "Notably, urban areas in states that repudiate non-compete covenants appear to experience much higher rates of new venture formation in the biotechnology sector than do states that permit employers to enforce these contractual provisions."[15] In understanding Silicon Valley biotechnology firms' higher patenting rates and greater employee mobility, one should look beyond culture for greater insight.

Data Analysis Methodologies

This paper's data analysis is broken into two parts. The first half conducts a chi- squared goodness-of-fit test for the different biotechnology patent class distributions – in absolute and relative terms – in 1995, 1999 and 1995-1999 between Silicon Valley and Route 128. The test is conducted in relative terms (biotech patents/1000 utility patents in a time period) as well as in absolute terms so that trends in overall patenting do not skew either region's biotechnology patent distribution, resulting in seemingly incompatible distributions. The chi-squared test ensures that this paper is correctly comparing two similar patent distributions. One of the strengths in looking at biotechnology patents is the greater degree of coherency between the top biotechnology patent classes in each region than the top IT patent classes.[16] The chi-squared test was limited, however, by the small sample size: two observed values for

Silicon Valley Patenting Multiples (1995-1999)

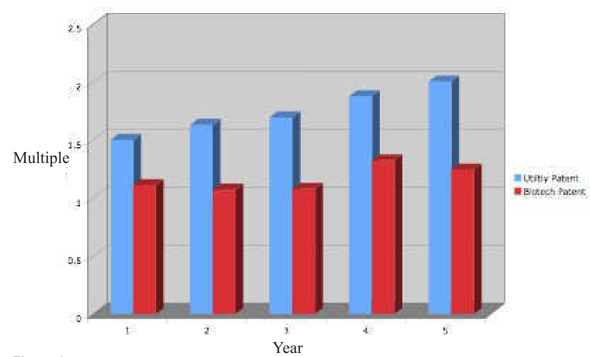

Figure 1a

each patent class in each time period (one for Silicon Valley and one for Route 128). Furthermore, the expected distribution with which the observed distribution was compared was an average of the two, not a distribution rooted in theory or a greater sample size.

The final stage of the data analysis combines metropolitan area USPTO patent data cross tabulated by patent class and year (1995-1999) with U.S. Census Bureau populations estimates from the Route 128 and Silicon Valley metropolitan areas to derive per capita patent ratios. After summing population estimates, patent statistics and per capita patent ratios, the analysis ultimately calculates an average patenting multiple for Silicon Valley relative to Route 128, communicating how many more times per capita Silicon Valley patents than Route 128 in biotechnology and total utility patents.

Results

Of the data analysis results above, the most significant are in Figure 1B and Figure 1C. In those figures, one finds that the Silicon Valley average per capita utility patenting multiple to be 1.77, meaning that over the 1995-1999 period, Silicon Valley patented on average 77% more per capita than Route 128! Furthermore, the Silicon Valley average per capita biotech patenting multiple over the 1995-1999 period was significantly smaller at 1.19. Nevertheless, this multiple's importance is great. Both numbers bode well for this paper's hypothesis.

There are two reasons the smaller 1.19 biotech multiple bodes well for the hypothesis that predicts increased patenting under nullified covenant not to compete regimes, despite the muted effect in comparison to the 1.77 multiple associated with total utility patenting. First, the biotech industry is a greater test of the effect varying enforcement of covenants not to compete has on patenting. The 1.19 multiple demonstrates that higher patenting ratios extend beyond Silicon Valley's traditional IT cultural sphere. Second, and most importantly, Boston's share of biotech patenting is proportionally much greater than that of Silicon Valley's; 29% of all Route 128 patents in 1995-1999 were in these top fourteen biotech classes

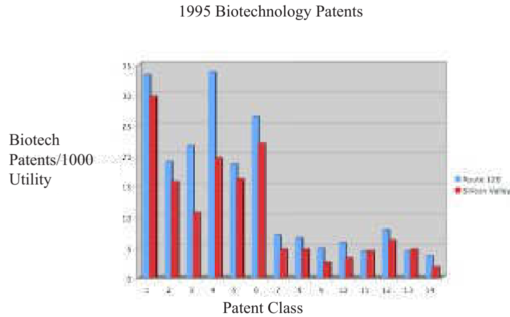

Figure 2a $X^2 = 5.80614071$

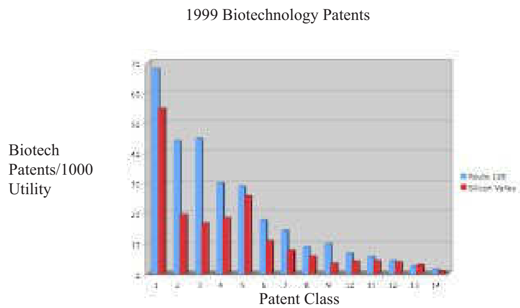

Figure 2b $X^2 = 17.59619984$

compared to 18% of Silicon Valley's in the same time period.[17] Therefore, a Silicon Valley multiple in favor of the hypothesis' prediction demonstrates a clear incidence of greater patenting in light of similarly distributed patent classes and the relative importance of biotech in Route 128's overall patenting.[18]

How can one be sure that this increased patenting is a result of nullified covenants not to compete? This data analysis cannot conclude definitively – as a sophisticated regression analysis might – that higher patenting rates are in fact a result of nullified covenant not to compete enforcement in Silicon Valley. Furthermore, what if the proportion of Silicon Valley's population employed in R&D is precisely 77% greater than the proportion of the population employed in R&D in Route 128, or even more? Then patenting per capita is effectively the same! This paper's analysis is based on the assumption that population is a rough but appropriate proxy for those employed in innovative activity in the Route 128 and Silicon Valley high-technology clusters.

Again, this is where standing on the shoulders of other scholars becomes imperative. Saxenian stresses the importance Silicon Valley's unique institutional culture of cooperation, specialization and high employee mobility has had in capitalizing on unprecedented external economies of scale. Furthermore, Gilson RJ; Sorenson O, Stuart TE and Fallick B, Fleischman CA, Rebitzer JB offer legal as well as economic analysis linking the distinctive dynamics Saxenian highlights to the nullification of covenants not to compete in California. By treating firms and entrepreneurs as rational actors,

this paper expects that both established firms and new entrants would patent more under increased employee mobility than under less because of new vulnerabilities and opportunities created.

Conclusion

Assuming that the nullification of covenants not to compete does increase the incidence of patenting, policymakers are still unable to confidently chart a course of action. Several unknowns remain. Is patenting a result of new firm creation or a purely defensive – rather than innovative – measure? Silicon Valley's success implies the former. Moreover, nullifying covenants not to compete does not guarantee greater innovation even if a relationship does exist while potentially undermining other facets of the economy. The proper external economies of scale exemplified by the biotech and IT industries need to be in place for high employment mobility to generate worthwhile returns.

Based solely upon the data analysis, this study cannot determine conclusively that the nullification of covenants not to compete in California leads to higher patenting rates in Silicon Valley than in Route 128. Nonetheless, this data in conjunction with causal effects scholars of agglomeration economies detail presents an outcome that is consistent with the paper's logic and offers no reason to reject the hypothesis. The need for greater detail in the analysis, not counterevidence, prohibits this paper from conclusively discerning the nature of a relationship.

Notes

1. Krugman P, p. 415
2. Sorenson O, Stuart TE, p. 15
3. Gilson RJ, p. 43
4. Fallick B, Fleischman CA, Rebitzer JB, p. 20
5. Saxenian AL, p. 25
6. Numerous academics have examined this link (Fallick B, Fleischman CA, Rebitzer JB, November 2005; Fleming L, Decmeber 2005; Gilson RJ, 1999)
7. Gilson RJ, p. 39
8. Saxenian AL, p. xi
9. Gilson RJ, 1999
10. Fallick B, Fleischman CA, Rebitzer JB, p. 20; Sorenson O, p. 32
11. Gilson RJ, 1999; Fleming L, December 2005; Saxenian AL, 1994 all use Silicon Valley and Route 128 in examining covenants not to compete.
12. Saxenian AL, p. 17
13. http://www.baybio.org/wt/home/Industry_Statistics
14. Saxenian AL, p. 27
15. Sorenson O, Stuart TE, p. 32
16. The top fourteen biotechnology patent classes for Silicon Valley are the same top fourteen biotechnology

Figures and Tables

Silicon Valley Utility Patenting Multiple					
1995	**1996**	**1997**	**1998**	**1999**	**Average**
1.500436369	1.630145897	1.694480938	1.876708235	2.003442084	1.774368376

Fig. 1B

Silicon Valley Biotech Patenting Multiple					
1995	**1996**	**1997**	**1998**	**1999**	**Average**
1.11104049	1.071255067	1.079603241	1.323732215	1.245783287	1.189895106

Fig. 1C

	1995	1999	1995-1999
Absolute Patent # Distribution	16.64161987	86.01068487	192.7043752
Relative Patent # (per 1000 Utility) Distribution	**5.80614071**	**17.59619984**	**11.39934355**

Fig. 3. Chi Squared Critical Value for (p=.05, df =13) = 22.36

patent classes for Route 128. (Casto J, Appendix A, December 2006)
17. Appendix A
18. All three biotech patent (per 1000 utility patents) distributions of the top fourteen biotech classes passed the chi-squared goodness-of-fit test at the 5% level. (Casto J, Appendix A, Dxxecember 2006)

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Appendix A: Biotechnology and Total Utility Patenting Rates (1995-1999) in Silicon Valley and Route 128

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United States Census Bureau: Metropolitan Population Estimates.URL: http://www.census.gov/popest/archives/1990s/MA-99-03a.txt

United States Patent Office: Information Products Division URL: http://www.uspto.gov/web/offices/ac/ido/oeip/taf/mclsstc/mregions.htm

Jon Casto is senior majoring in Economics and International Relations with a Spanish Language minor, focusing on international political economy and developmental economics. His academic interests also include democratic development and intellectual property regimes.

Jon would like to thank Professor Petra Moser for challenging the paradigm of what a Stanford Economics undergraduate course should entail and for her infinite patience as a research mentor. He would also like to thank Professor Don Emmerson for turning his undergraduate career into a truly investigative endeavor.

Jon will spend the summer after graduation in the outskirts of Delhi, India working on a social entrepreneurship project, aiming to empower rural Indians by creating greater employment opportunities through information communication technologies. Come September, Jon will find himself asking: Now what? He is open to any and all suggestions.

Ethnic Inequality and Civil War

Jonathan Phua, Stanford University

A growing literature in Political Science focuses on the relationship between ethnic economic inequality and civil war onset. Estimating the impact of ethnic inequality on civil war onset is difficult because of measurement error and lack of cross-national data. Existing studies are inconclusive and highly limited due to selection bias. Small sample sizes have significantly constrained the power of statistical tests. We use an original dataset spanning 515 ethnic groups in 99 countries to test the impact of ethnic inequality on civil war onset. We find ethnic inequality is positively related to civil war onset. However, contrary to conventional wisdom, this relationship is weak and is mitigated by other more influential factors like group size and political power.

Conventional wisdom suggests ethnic inequality predicts civil war onset. Stewart suggests that when individual self-esteem is bound up with ethnic identity, ethnic inequality produces grievances that lead to mobilization and civil war[1]. However, recent cross-national studies have been inconclusive due to methodological problems[2] (Fearon J & Laitin D, working paper presented at APSA 1999). Although case studies suggest ethnic inequality increases rebellion by disadvantaged groups, they are not generalizable and suffer from selection bias[3,4].

This paper will conduct a large-sample study of cross-national ethnic inequality. First, we review the challenges in testing the impact of ethnic inequality on civil war. Next, we attempt to overcome these challenges through a large-N statistical analysis of ethnic inequality and civil war onset. We draw on an original dataset comprising surveys conducted by the Demographic and Health Surveys (DHS) group and research conducted by Laitin, Fearon, Kasara and myself. Finally, we examine the case of the Hutu in Rwanda in order to illustrate other variables that interfere with the impact of ethnic inequality on civil war. Our results suggest that economic disadvantages weakly predict for ethnic rebellion. However, other factors like political power and group size strongly affect observed outcomes.

Theoretical Review

Political scientists have proposed both rationalist and relative deprivation explanations for civil wars (Sambanis N, presented at Brookings Institution Trade Forum 2004). Rationalist theories argue civil war is likely in states with conditions conducive to rebel organization, such as low income per capita, economic growth or mountainous terrain[5,6]. These conditions either decrease rebellion's opportunity cost or decrease the capacity of the state, facilitating the mobilization of an insurgent movement. Relative deprivation theories argue that civil wars occur when a sub-state group becomes sufficiently aggrieved to mobilize for political change.

The available evidence supports rationalist explanations for civil war (Sambanis N, presented at Brookings Institution Trade Forum 2004). However, a growing body of literature focuses on ethnic inequality, a type of relative deprivation. Stewart argues that the intersection of economic inequality and cultural differences makes culture a powerful organizing force[1]. Klugman notes that without economic inequality, group identity is likely to be weak[7]. But group inequality may have an impact on individual welfare, deepening grievances. Where the group responsible for inequality has a monopoly on political power, the aggrieved group may seek change through violence.

Empirical tests on this relationship are inconclusive and sparse. Although econometric analysis by Gurr and Moore suggests ethnic inequality increases the probability of civil war, their analysis is purely based on published reports, without rigorous empirical foundation[2]. Using the same data as Gurr and Moore, Fearon and Laitin find no relationship between inequality and civil war, citing both multicollinearity and measurement error (working paper presented at APSA 1999).

Why so few cross-national studies? Humphreys notes inequality data is unavailable for many countries (Harvard Portal on Economics and Conflict, 2002). Our research suggests these countries have vested interests in preventing data-collection. For example, Lebanon's 1926 Constitution allocates government offices using the size of each religious sect. The Lebanese government has had a powerful disincentive against collecting data that could shift this balance of power[8]. Further, these countries are often undergoing political instability that impedes data collection. If data is unavailable for countries suffering precursors to civil war, our tests will suggest the relationship between ethnic inequality and civil conflict is weaker than it is (Humphreys M, Harvard Portal on Economics and Conflict, 2002).

Another reason for the lack of cross-national studies is measurement error. Many countries face problems operationalizing definitions of their major ethnic groups. For example, heterogenous ethnic characteristics of Mestizos in Mexico make it hard to distinguish between Mestizos, Whites and Indigenous Peoples based on language or region. This makes it difficult to construct good estimates of ethnic inequality with data. Further, large-N cross-national comparisons are based on household surveys that vary in quality, reducing the likelihood that relationships between variables will be found[9]. Stewart and Klugman have proposed broader definitions of ethnic inequality that include political, economic and socio-cultural differences[1,7]. However, it is unclear if a variable will be sensitive to so wide an array of values or if it can be constructed at all.

Ethnic Inequality and Civil War

Surveys administered by the Demographic and Health Surveys (DHS) group provide a way around these problems. Using factor analysis, they assign individual wealth scores derived from responses to asset-ownership questions. This wealth score cannot be used cross-nationally as it is an ordinal ranking, not a cardinal value. We match individuals to their ethnic groups according to language or religion, following rules developed by Kasara (Kasara K, unpublished research, 2005) and based on a list of ethnic groups developed by Fearon[10]. We then compute the quintile of each individual's wealth score and aggregate by ethnic group, to find each group's mean wealth quintile on a scale of 1 to 5. This procedure creates a sample of 216 ethnic groups across 31 countries, enumerated by the *ethnic group*.

Next, we augment our DHS