

Universities, Entrepreneurship, and Public Policy: Lessons from the United States and Abroad

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Universities, Entrepreneurship, and Public Policy: Lessons from Abroad

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Purpose

- Review the recent literature on academic entrepreneurship and public policy
- Compare and contrast the research findings in the United States and overseas
- Draw out the policy lessons

Differences between the U. S. and Other Countries

1. The legal environment for academic entrepreneurship in the U.S. differs from that elsewhere
2. The U.S. economy is more entrepreneurial

Intellectual Property Rights

U.S.: Universities own IP

- Focus on tech transfer and institutional features on supply side

Continental Europe: Researchers own IP

- Focus on spillover mechanisms and university-industry links more generally, esp. spin-offs and industry liaison offices (ILOs)

Bayh-Dole Act, 1980

- Technology Transfer Offices in U.S. universities
 - 1980: 25
 - 1990: 200
 - 2003: >300
- Patents issued to universities, hospitals and research institutes
 - 1979: 177
 - 1984: 408
 - 1989: 1,008
 - 2003: 3,673
- Start-up companies formed
 - 1980-1993: 1,169
 - 1994-2002: 3,151

Technology Transfer Offices

- Purpose: assist university researchers in disseminating research results for the public good.
- Success only partially reflected in income generated (but most universities make little or no money in technology transfer) or the number of business start-ups.

Technology Transfer Offices (cont'd)

- Success depends on
 - the interface between the university and the business community
 - receptivity in the surrounding community
 - culture, organization, and incentives within the universities themselves.
- The most critical organizational factors are
 - faculty reward systems
 - OTT staffing/compensation practices
 - cultural barriers between universities and firms
 - portion of inventions disclosed varies with faculty quality
- Constant returns to scale

Technology Transfer Offices (cont'd)

University equity holdings are a function of

- university's prior experiences with licensing
- organization and policies of the technology transfer office
- Incentives: a low inventor's share of royalties increases new firm formation

Brief Synopsis of U.S. Literature

- Focus on organization of technology transfer activities at universities
- Substantial increase in university patenting and in the academic share of total patenting post Bayh-Dole

Technology Transfer Outside USA

- Since the universities cannot commercialize IP that they do not own, there have been limited incentives for universities to establish technology transfer units.
- As a result, European countries have generally adopted the less targeted spillover model (as distinct from a more formalized technology transfer model) of commercializing academic research.
- This is now changing, as national governments charge universities with a 'triple task' in addition to teaching and research: interaction with the business community to promote economic growth.
- Focus on spillovers from academic research (as distinct from more targeted technology transfer) and on broader university-industry links, esp. university spin-offs and industrial liaison offices.

The European Spillover Model (cont'd)

- Implications of "Third Task" mandate:
 - Universities need to develop a more comprehensive and coherent (purposive) institutional framework for entrepreneurial activity.
 - A positive attitude among faculty and students to commercialization of research results, well-developed alumni networks, and regular contacts between faculty and industry representatives are not enough.
 - A value shift (cultural change) within universities is necessary to embrace and not merely tolerate entrepreneurial values.

The European Spillover Model (cont'd)

Comparison of Sweden and U.S.:

- Disappointing commercialization of academic research results in Sweden despite the highest R&D/GDP ratio in the world as well as leadership in research publications and citations of research results.
- Attributed to institutional differences: lack of competition for research funds and personnel, lack of interaction with industry.
- Weak incentives for commercialization and start-ups.

Academic Spin-Offs

- University spin-offs (USOs), not licenses, are the main vehicle of technology transfer from academic institutions, given the lack of university ownership of IP.
- Successful universities have clearer (more purposive) strategies towards the spinning out of companies.
- Successful universities have better infrastructure (greater expertise and more established networks) for fostering spin-out companies.

Academic Spin-Offs (cont'd)

- High capability needed in TTOs
- Need for entrepreneurial training and commitment of academics
- Need for continual interaction between academic researchers and new business ventures
- Highly innovative firms derive most benefit from collaborative research with universities, both nationally and internationally
- Knowledge-intensive business service firms can fill some of the functions of university-industry liaison, functioning as providers, purchasers or partners.

Science Parks

- More than half of the world's 250 science parks are in the U.S. – but there are no recent studies of their impact
- Many studies elsewhere
- Mixed results, at best

Culture and Environment

Internal university culture matters

- Johns Hopkins University: little local economic impact in spite of large federal research funding
 - Not a university objective
 - Lack of incentives for commercial activity
 - Mission and academic culture focus on 'open science'

Culture and Environment (cont'd)

The interface between the university and the business community is another important institutional factor.

- One dimension is the degree and nature of collaboration between the university and the entrepreneurial firms in its environment
 - industry-sponsored contract research
 - consulting
 - technology licensing
 - technology development and commercialization
- Well-connected institutions develop high-impact patent portfolios

Culture and Environment (cont'd)

- Importance of 'commercialization environment' – but few studies mention clusters.
- Industries tend to concentrate geographically because entrepreneurs need access to information and resources. Since existing firms often represent the largest pools of these important factors, new firms tend to arise in the same areas as existing ones, and hence reproduce the industrial geography.
- Industries cluster because entrepreneurs find it difficult to leverage the social ties necessary to mobilize essential resources when they reside far from those resources. Therefore, opportunities for high tech entrepreneurship mirror the distribution of critical resources.

Conclusions

1. Institutions matter

- The ownership of intellectual property rights is of fundamental importance.
- Bayh-Dole provided a 'shock' to the U.S. system: re-organization and formalization of technology transfer from U.S. universities in the form of technology licensing or transfer offices.
- No similar shock has occurred in Europe, although charging universities with the "Third Task" is a step in a similar direction.
- The U.S. literature focuses on the technology supply side, while the European literature focuses on the demand side: general spillovers of academic research and the institutional environment outside the universities.

Conclusions (cont'd)

2. Need for systemic analysis: both supply and demand for technology

- Investment in knowledge and human capital is not enough: must also create favorable conditions for knowledge transfer/spillover and entrepreneurship

Policy lessons

- Europe can learn from the U.S. about more formal and purposive arrangements for technology transfer.
- The U.S. can learn (what works and doesn't work) from Europe about external arrangements (institutions and policies), especially culture and business environment.
- Science parks have not generally been successful.

Lessons from Quantitative and Qualitative Research on the Effectiveness of University Technology Transfer in the U.S. and U.K.

Donald S. Siegel
 Professor
 Rensselaer Polytechnic Institute

Lessons Learned From Quantitative and Qualitative Research on the Effectiveness of University Technology Transfer in the U.S. and U.K.

Donald Siegel
 Professor of Economics
 Rensselaer Polytechnic Institute
 President, Technology Transfer Society
 Editor-Journal of Technology Transfer



Outline

- Background Information on University-Industry Technology Transfer (UITT)
- Shameless Self-Promotion: Plugs For Technology Transfer Society/Journal of Technology Transfer
- Brief Discussion of the Nature of Studies of the Effectiveness of Technology Transfer
- Summary of Key Research Quantitative and Qualitative Results
- Strategic Implications
- Implications for Entrepreneurial Education

UITT and The Creation of New Industries

<u>Period</u>	<u>Technology Developed</u>	<u>(Primary) University</u>	<u>Industry Created</u>
1940s	Electronic Calculator	University of Pennsylvania	Computers
1960s	Fiber Optics	MIT	Telecommunications
1970s	rDNA	Stanford, California	Biotechnology
1980s	Supercomputing	Illinois	Internet
1990s	Sequencing of DNA/ Human Genome Project	Cal Tech, Johns Hopkins	Pharmacogenomics

Key Evidence

- 2001 Special Issue of the Journal of Technology Transfer on “Organizational Issues in University-Industry Technology Transfer”
- 2003 Special Issue of the Journal of Technology Transfer on “Economic and Managerial Implications of University Technology Transfer”
- 2004 Special Issue of the Journal of Technology Transfer on “Entrepreneurship and University Technology Transfer”
- 2003 Special Issue of International Journal of Industrial Organization on the “Economics of Intellectual Property at Universities”

Key Evidence (cont.)

- 2005 Special Issue of the Journal of Business Venturing on “Science Parks and Incubators”
- Forthcoming Special Issue of Economics of Innovation and New Technology on “Research Collaboration,” in conjunction with 2004 Technology Transfer Society (T2S) Meetings
- Forthcoming Special Issue of Research Policy on “The Creation of Start-up Firms at Public Research Institutions,” in conjunction with 2004 Technology Transfer Society (T2S) Meetings
- Forthcoming Special Issue of Research Policy on “University-Based Technology Initiatives,” in conjunction with 2004 Technology Transfer Society (T2S) Meetings

Research on Institutions and Agents Involved in University Technology Transfer

Agents

- University Scientists
- Industry Scientists (Interacting w/University Scientists)

Institutions

- Industry-University Cooperative Research Centers
- University Technology Transfer Offices
- Science Parks
- Incubators
- Firms That Interact With Universities
- Venture Capital Firms

Research on Institutions and Agents Involved in University Technology Transfer

Indicators of Output/Performance

- Invention Disclosures
- Patents
- Number of Licensing Agreements
- Licensing Revenue
- Research Productivity of Industry Scientists/Firms
- Research Productivity of University Scientists
- “Productivity” of Universities in Technology Transfer
- Start-Up Formation
- Survival
- Employment Growth

Selected Empirical Studies of the University Technology Licensing and Patenting

Author(s)	Methodology	Results
Siegel, Waldman, and Link (2003)	Productivity of Licensing-SFA	Organizational and Environmental Factors Have Considerable Explanatory Power
Thursby and Kemp (2002)	Productivity of Licensing-DEA	Private Universities More Efficient; Universities With Medical Schools Less Efficient
Thursby and Thursby (2002)	Productivity of Licensing-DEA	Growth in Licensing/Patenting Due to an Increase in the Willingness of Professors to Patent and License and Firm Outsourcing of R&D
Link and Siegel (2003)	Productivity of Licensing-SFA	Higher Royalty Shares For Faculty Associated With Greater Licensing Income; Land Grant Universities Are More Efficient

Selected Empirical Studies of the University Technology Licensing and Patenting

Author(s)	Methodology	Results
Siegel, Waldman, Atwater, and Link (2003)	Quantitative Analysis of Qualitative Data	<p>Three Key Impediments:</p> <ul style="list-style-type: none"> • Informational and Cultural Barriers Between Universities and Firms (Especially for Small Firms) • Insufficient Rewards for Faculty Involvement in UITT • TTO Staffing and Compensation Practices (e.g., High Rate of Turnover, Insufficient Business/Marketing Experience)

Selected Studies of University Science Parks

Author(s)	Unit of Analysis	Results
Siegel, Westhead, and Wright (2003)	Firms Located on Science Parks (U.K.)	Firms Located on University Science Parks Have Higher Research Productivity Than Comparable Firms
Westhead and Storey (1995)	Firms Located on Science Parks (U.K.)	Science Park Firms With a Link to the University Have a Higher Survival Rate Than Science Park Firms Without Such a Link
Link and Scott (2003)	Science Parks (U.S.)-Based on Self-Reported Qualitative Data	Proximity to a University and Availability of Venture Capital Enhance Growth; Science Parks Enable Universities to Generate More Publications and Patents, More Easily Place Graduates, and Hire Preeminent Scholars

Selected Empirical Studies of University-Based Start-ups and Entrepreneurial Activity at Universities		
Author(s)	Unit of Analysis	Results
Louis, Blumenthal, Gluck, and Stoto (1989)	Faculty Members in the Life Sciences	Key Determinant of Faculty-Based Entrepreneurship: Local Group Norms; University Policies and Structures Have Little Effect
DiGregorio and Shane (2003)	University-Based Startups	Two Key Determinants of Start-up Formation: Faculty Quality and Equity-Friendly University Policies
Markman, Phan, Balkin, and Gianiodis (2005)	TTOs and University Startups	The Most Attractive Licensing Strategies For Entrepreneurship Are <u>Least</u> Likely to be Favored by the University (Due to Risk Aversion and Short-Run Revenue Maximization)

Selected Empirical Studies of University-Based Start-ups (cont.)		
Author(s)	Unit of Analysis	Results
Zucker, Darby, and Brewer (1998)	Relationships Involving “Star” Scientists and U.S. Biotech Firms	Location of Star Scientists Predicts Firm Entry in Biotechnology
Markman, Phan, Balkin, and Gianiodis (2004a)	TTOs and University-Based Startups	Equity Licensing and Startup Formation Are Positively Correlated With TTO Wages;
Siegel, Waldman, Atwater, and Link (2003)	TTOs and Firms	TTOs Serve the Needs of Large Firms More Effectively Than Those of Small, Entrepreneurial Companies

Key Stylized Facts From Initial Qualitative Research (Relevant to the Measurement and Analysis of the Effectiveness of Technology Transfer)
<ul style="list-style-type: none"> • Patents Are Not that Important for Certain Technologies/Industries • Many Scientists do not Disclose Inventions • Faculty Involvement/Engagement is Critical • Universities Often Hire Outside Lawyers to Negotiate with Firms • Multiple “Outputs” (e.g., licensing, startups, sponsored research)

Key Quantitative Results
<ul style="list-style-type: none"> • Production Function Models Provide a Good Fit • Staff in the TTO Add Significant Value to the Commercialization Process • No Strong Consensus on Returns to Scale • Private Universities Appear to Be Somewhat More Productive • Incentives Matter (e.g., Royalty Distribution Formula), But So Do Organizational Practices and Other Institutional Policies • Results Are Fairly Robust to Single or Multiple Outputs

Key Stylized Facts From Qualitative Research (cont.)
<p><u>Major Impediments to University Technology Transfer:</u></p> <ul style="list-style-type: none"> • Informational and Cultural Barriers Between Universities and Firms (Especially for Small Firms) • Insufficient Rewards for Faculty Involvement in Technology Transfer at Some Institutions, , Especially w.r.t. Entrepreneurial Activity • TTO Staffing and Compensation Practices (High Rate of Turnover, Insufficient Business/ Marketing Experience, Possible Need for Incentive Compensation) • Education/Training is Needed for Faculty Members, Post-Docs, and Graduate Students in the Specifics of the Entrepreneurial Process, the Role of Entrepreneurs, and How to Interact with the Business/Entrepreneurial Community

Key Stylized Facts From Qualitative Research (cont.)
<ul style="list-style-type: none"> • A Failure to Address These Barriers Will Induce More Faculty Members and Firms to Circumvent the TTO and Engage in “Informal” UITT • University Technology Transfer Should be Considered From a <u>Strategic</u> Perspective

Strategic Implications of University Technology Transfer-Formulation Issues

- **Setting Institutional Goals/Priorities**
- **Resources Devoted to University Technology Transfer Choices Regarding Technological Emphasis**
- **Strategic Choices Regarding Modes of University Technology Transfer:**
 - **Licensing**
 - **Startups**
 - **Sponsored Research**
 - **Other University Technology Transfer Mechanisms That are Focused More Directly on Stimulating Economic Development (e.g., Incubators and Science Parks)**

Strategic Implications of University Technology Transfer -Implementation Issues

- **Improving Information Flows**
- **Organizational Design/Structure**
- **HRM Practices-Staffing/Compensation of TTO Personnel**
- **Reward Systems for Faculty Involvement in University Technology Transfer (perhaps including P&T)**
- **Implementation Issues Regarding Modes of University Technology Transfer**
 - **Different Ways of Structuring Licensing Agreements**
 - **Academic vs. Surrogate Entrepreneurs**
 - **Different Ways to Manage University-Based Science Parks**

Universities Focusing on Start-up Formation Should Develop a Technological Entrepreneurial Curriculum, Applied to TT Stakeholders-Role of Faculty Conducting Research on Technological Entrepreneurship

- **Interdisciplinary Theory**
- **Evaluation/Policy Research**
- **Practitioner Research**
- **Academic Conferences**
- **Research Workshops**
- **Ph.D. program**

Aspects of a Technological Entrepreneurship Curriculum -Institutional Level

- **Incubator/Technology Park**
- **Technology Transfer**
- **Knowledge Clusters**
- **Angel Network**
- **Venture Forum**
- **Vice Provost-Entrepreneurship**
- **Incentives for Faculty Members to Be Engaged in Entrepreneurial Activity (and Perhaps For Successful Ones to Serve As Mentors)**

Aspects of a Technology Entrepreneurship Curriculum -Relating to (Internal and External) Technology Transfer Stakeholders

- **Focused Graduate Courses and Executive Programs for the Growing Class of Technology Transfer Professionals (e.g., members of AUTM, T2S members at Federal Labs)**
- **Additional Entrepreneurship Courses**
- **Technology Familiarization**
- **Internships**
- **Idea Labs**
- **Business Plan Competitions**
- **Venture Forum**

Panel 3, 3:15 p.m.

SME Labor Challenges: Workforce and Knowledge

The moderator, Brian Headd, of the Office of Advocacy, introduced the range of labor issues which the panel addressed: employment regulation, the aging workforce in developed nations, and entrepreneurship education.

Adriana Kugler, of the University of Houston and the Universitat Pompeu Fabra of Barcelona, compared labor regulation in Italy, Spain, Germany, Latin America, and the United States. Kugler found wide variations in labor market regulations affecting small and large businesses and different types of workers. Businesses with fewer than 15 employees in the United States and Europe are exempt from labor protection laws, but they experience higher employee turnover as a result. Kugler also found that businesses that are just under the threshold are less likely to expand than larger businesses, and they have a hard time attracting certain kinds of workers. On the other hand, these regulations have given very small businesses a great deal of flexibility to adjust to the prevailing employment market.

Jane Lommel, president of the research firm Workforce Associates, examined the policy implications of huge aging workforces in the United States, Europe, and Asia. Lommel illustrated the demographic bubbles looming in the near future as the ratio of



Francis Rushing (right) contributes his remarks to the panel on labor and workforce challenges. On the left are Jane Lommel, Adriana Kugler, and Brian Headd.

active workers to retirees grows smaller and smaller. Countries such as China, Spain, and Germany, with fewer younger workers, are already feeling pressure on their national retirement systems, and the United States is not far behind. Developing nations are starting to see similar patterns—a huge aging population and fewer younger people. Among the reasons for this trend are declining fertility rates, increased longevity, and declining participation of older workers. Some possible policy changes to address this imbalance include raising the retirement age, eliminating mandatory retirement ages in countries where they still exist, raising workforce participation rates among older citizens, and raising the minimum eligibility age to receive a government pension.

Francis Rushing, economics professor emeritus at Georgia State University, proposed changes within the U.S. educational system to inspire, nurture, as well as instruct the entrepreneurs of the future. Rushing’s recommendations encompassed a bottom-to-top re-emphasis on the entrepreneurial spirit and skill set. These included supporting the transition to an enterprising learning environment; praising and honoring current as well as past entrepreneurs; advocating entrepreneurship as a vocational choice; infusing teacher training and education with enterprising content and techniques; encouraging university-level entrepreneurship programs to use their resources to develop curricula at the pre-university level; and setting an example of an enterprising person, taking action when opportunities arise in one’s own work and community to help our youth become enterprising people.



Pictured from top to bottom: Adriana D. Kugler, associate professor, University of Houston and Universitat Pompeu Fabra; Jane Lommel, president, Workforce Associates, Inc.; Francis W. Rushing, professor emeritus, Georgia State University.

Labor Protection Regulations and Small Businesses

Adriana D. Kugler
University of Houston and
Universitat Pompeu Fabra, Barcelona

Labor Protection Regulations and Small Businesses

Adriana Kugler
University of Houston,
Universitat Pompeu Fabra,
NBER, CEPR and IZA

Background

- Labor market regulations are often viewed as reducing the ability of businesses to adjust their labor force.
 - At the same time, labor regulations often differ across businesses and workers of different types.
 - In particular, in most countries labor protection laws differ between small and large businesses.
-

In what follows...

- I will document how labor protection laws, which restrict the ability of businesses to layoff workers, differ between small and large businesses.
 - Then, I will discuss the evidence showing how labor protection laws affect the behavior of small and large businesses differentially.
-

Labor Protection Regulations in Small and Large Businesses

- In many countries, labor protection laws vary substantially between small and large businesses.
 - In particular, differential labor protection laws for small/large employers exist in:
 - North America.
 - Europe.
 - Not in Latin America, except Argentina.
-

Labor Protection in the U.S.

- Unfair dismissal provisions apply across-the-board for businesses of all sizes.
 - At the same time, anti-discrimination laws, which increase costs of dismissing minorities and disabled workers, apply differentially to small and large businesses:
 - Title VII of Civil Rights Act.
 - Affirmative Action.
 - American with Disabilities Act.
-

Anti-Discrimination Laws in the US

- Title VII of Civil Rights Act of 1964 – illegal to discriminate on the basis of race, sex, color, religion, or national origin. Applied to private sector employers with more than
 - 100 employees in 1965,
 - 75 employees in 1966,
 - 50 employees in 1967,
 - 25 employees in 1968,
 - 15 employees starting in 1972.
-

-
- Affirmative Action Programs - require federal contractors with more than 50 employees to maintain Affirmative Action plans for minorities and women.
 - American with Disabilities Act of 1990 – outlaws discrimination against the disabled in hiring, firing and pay. Covered employers with more than
 - 25 employees initially, and
 - 15 employees, starting in 1994.
-

Labor Protection in Europe

- In Europe, fair and unfair dismissal and advance notice provisions apply differentially to small/large businesses.
 - Italy:
 - Statuto dei Lavoratori of 1970 – required employers with more than 15 employees to hire back and pay foregone wages to unfairly dismissed workers.
 - Law No. 108 of 1990 – introduced costs of 2.5-6 months of pay for unfair dismissals by employers with less than 15 employees.
-

Spain:

- Unfair Dismissals – apply across-the-board for businesses of all sizes.
 - Fair Dismissals – severance of 20 days per year worked for employers with more than 25 employees, but only 60% for employers with less than 25 employees.
 - Advance Notice – 30 days for employers with more than 50 employees, but only 15 days for employers with less than 50 employees.
-

Germany:

- Protection Against Dismissal Act (PADA) – severance payments for unfair dismissals in establishments with more than
 - 5 employees and exempt those with less than 5.
 - In 1996, raised to 10 employees, exempting those with less than 10 employees.
 - In 1999, threshold dropped again to 5.
 - In 2004, threshold raised again to 10 employees.
-

Consequences for Small Businesses

1. A consequence of less strict labor protection legislation for small businesses is they face higher turnover, since
 - On the one hand, small employers are more likely to dismiss because cheaper for them to do so,
 - and, on the other hand, they are more likely to hire because they can fire workers costlessly if these turnout inadequate or face poor demand conditions.
-

Evidence:

- Higher turnover small than large businesses in Italy, Spain, and the U.S., but not in Germany (Kugler and Pica, 2003, 2005; Boeri and Jimeno, 2003; Acemoglu and Angrist 2001; Bauer, Bender, and Bonin, 2004).
 - Also, less churning when costs increase for small businesses, specially for those in highly volatile sectors (e.g., Kugler and Pica, 2005).
- Good, since more flexibility in adjusting employment.
-

But...

2. Another consequence of less strict labor protection legislation for small businesses is they may be less likely to expand if they are close to the threshold.

Evidence – establishments with 14 and 15 employees less likely to expand employment in Italy, though effect small (Kugler and Pica, 2005; Borgarello, Garibaldi, and Pacelli, 2004; Schivardi and Torrini, 2004; ISTAT, 2002).

3. Another consequence of less strict labor protection legislation for small businesses is they may have a harder time attracting certain workers.

Evidence:

- Minority and women moved to employers with more than 25 employees after 1968 in the U.S. (Carrington, McCue, and Pierce, 2000).
 - Also, increased minority employment in businesses with 15-24 employees after 1972 amendment (Chay, 1998; Hahn, Todd, and Van de Klaauw, 1999).
-

On the other hand...

- A consequence of imposing high severance across-the-board is small businesses may have incentives to operate in the underground economy.

Evidence:

- Much higher turnover in smaller businesses in Brazil, Colombia, and Peru, but not in Argentina where small businesses are exempt (Kugler, 1999, 2004; Saavedra and Torero, 2004; Paes de Barros and Corseil, 2004; Hopenhayn, 2004).
 - Probability of non-compliance with legislation is high among small businesses in Brazil, Colombia, and Peru, but not as high in Argentina (Kugler, 1999, 2004; Saavedra and Torero, 2004; Paes de Barros and Corseil, 2004; Hopenhayn, 2004; Almeida and Carneiro, 2005).
-

Conclusions

- Less strict labor protection law for small businesses in North America and Europe.
 - As a result, labor turnover higher in small businesses.
 - However, small businesses are also less likely expand above the threshold and to hire certain types of workers.
 - In countries where labor protection is strict across-the-board, small businesses are less likely to comply with legislation at all.
-

The Policy Implications of the Aging Workforce in Developed Countries

Jane M. Lommel
Workforce Associates, Inc.

Does an aging workforce matter? Let us count the ways!

- Growing dependency on older workers
 - Potential inter-generational issues
 - Rising healthcare insurance costs
 - Needs for workplaces to conform to limitations of older workers
 - Retraining & retreading issues
- Loss of experienced workers through retirements and death
- Rising dependency ratios
- Pension problems
 - Unfunded pensions
 - Deadweight drag of employer-provided defined benefit plans
- Growing workforce needs in geriatric health care

2

All of these policy issues stem from one basic cause

- In the developed countries, there are fewer and fewer workers to support growing numbers of older citizens who are not working.

Let's look at some facts.

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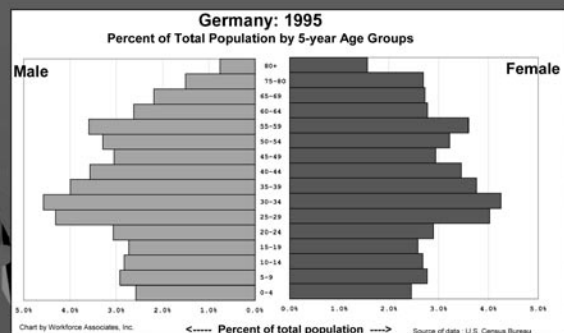
Start with the Changing Age Structure

Menu of Nations

- [Germany](#)
- [Japan](#)
- [Spain](#)
- [United States](#)
- [China](#)

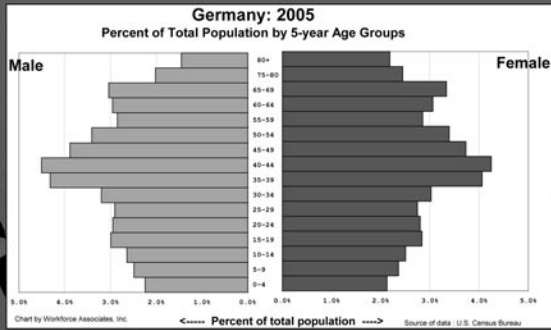
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Germany 1995



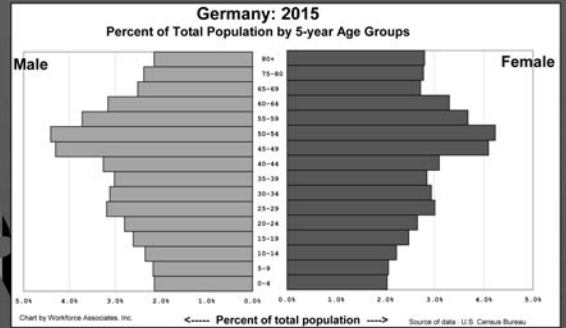
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Germany 2005



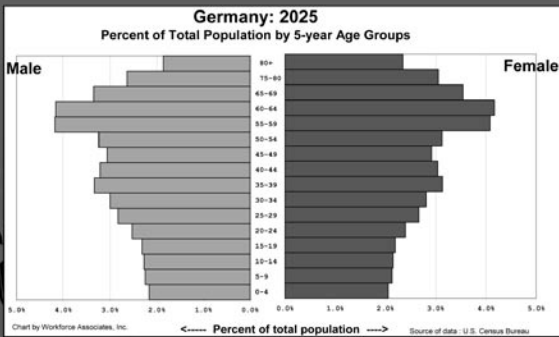
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Germany 2015



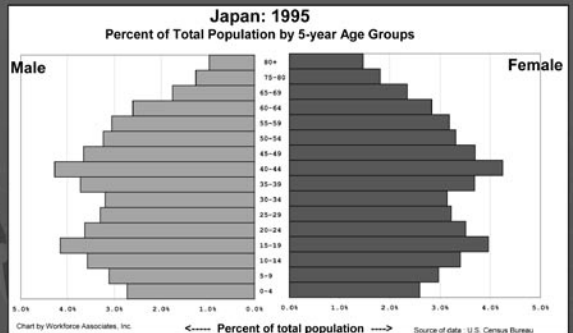
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Germany 2025



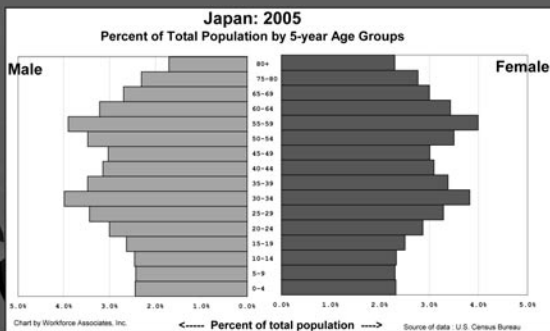
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Japan 1995



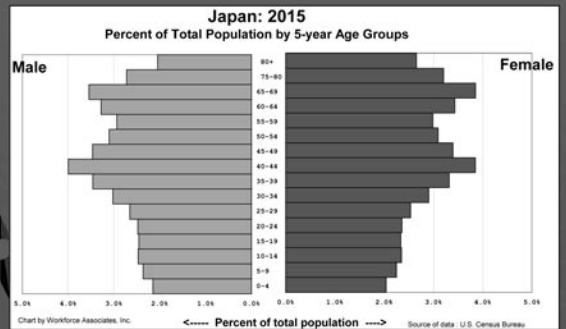
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Japan 2005



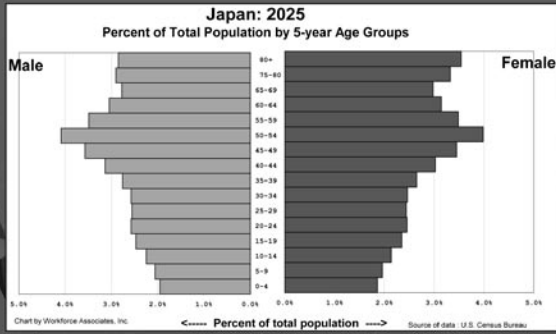
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Japan 2015



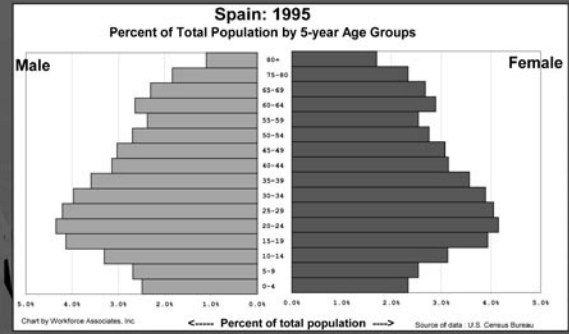
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Japan 2025



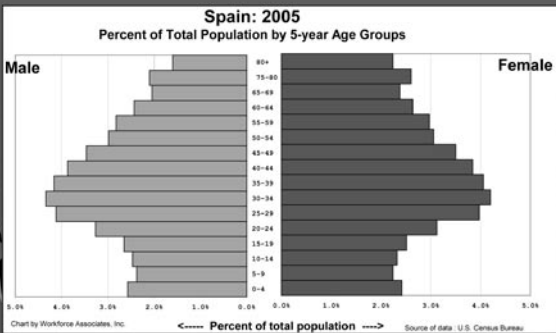
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Spain 1995



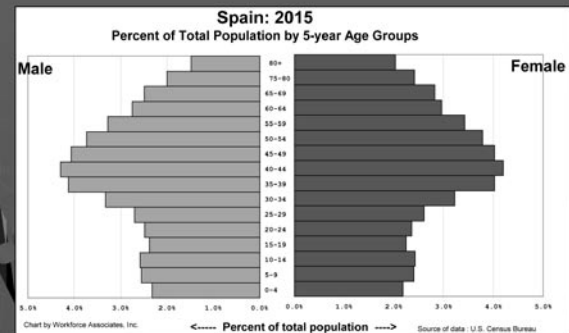
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Spain 2005



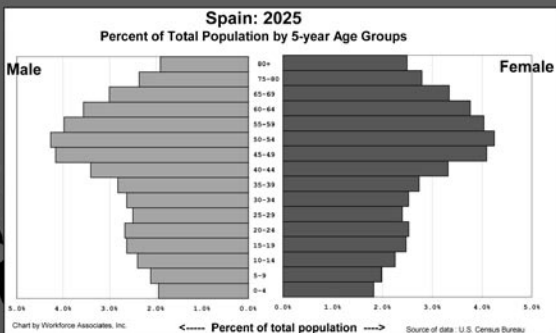
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Spain 2015



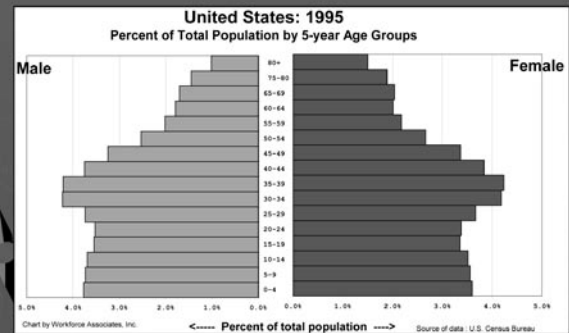
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Spain 2025



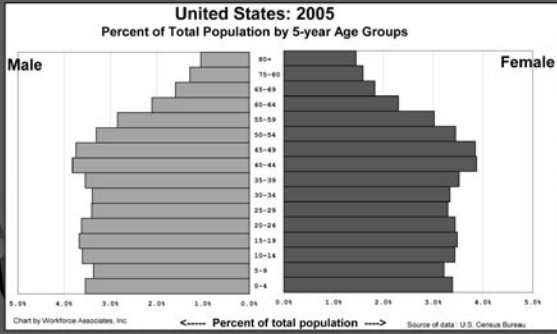
16

United States 1995



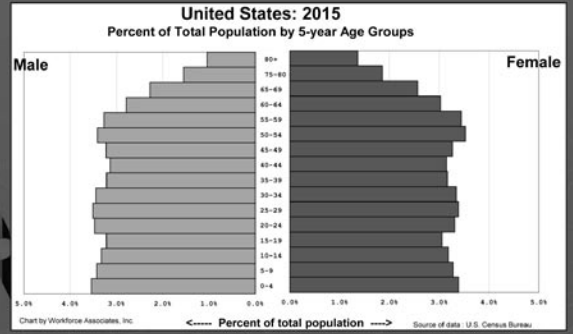
17

United States 2005



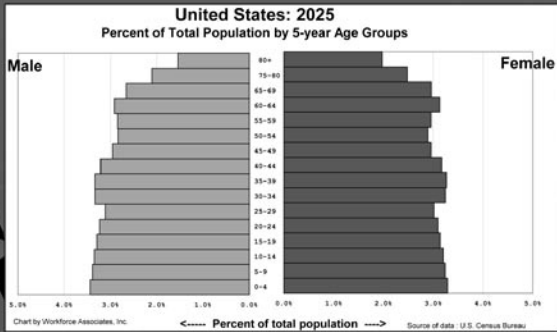
18

United States 2015



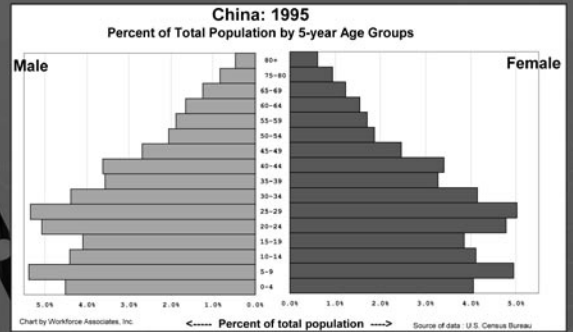
19

United States 2025



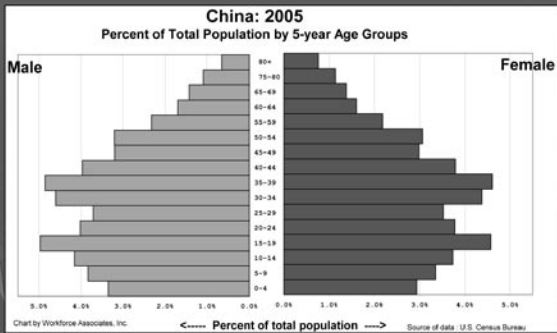
20

China 1995



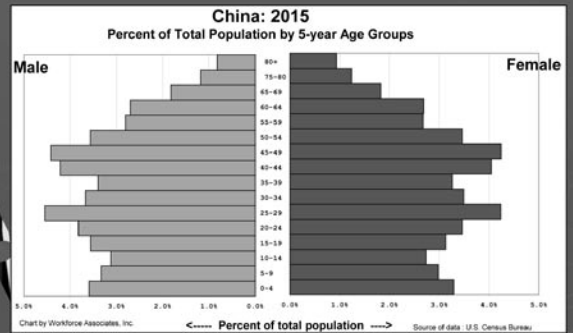
21

China 2005



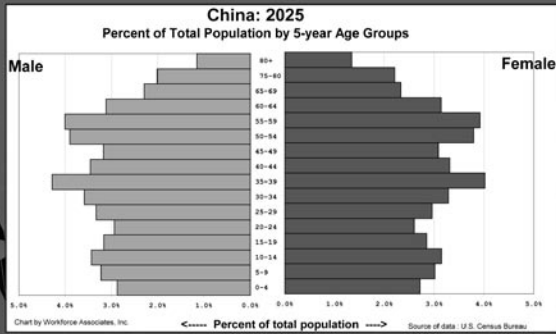
22

China 2015



23

China 2025



24

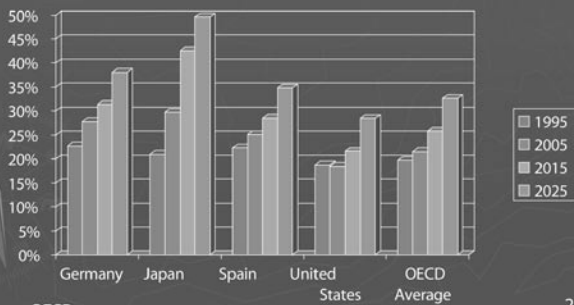
Which leads to...

...Rising age dependency ratios, i.e., each worker must support a growing number of non-working oldsters.

25

Populations & Workforces are Aging in the OECD

Age-dependency Ratio from 1995-2025 (projection):
Population aged 65 and over as a percentage of population aged 15-64



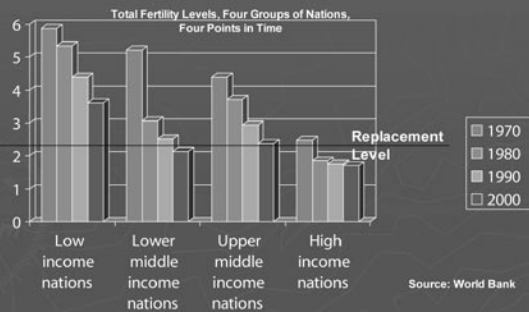
26

Why did it happen?

Reason #1: Declining fertility rates

27

Fertility decline is the major reason of population aging



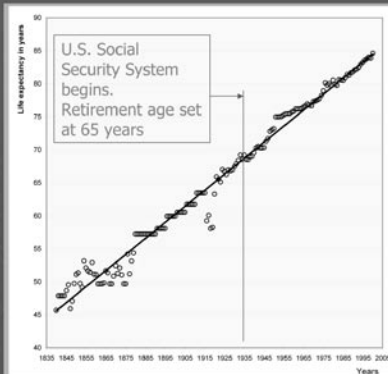
28

Why did it happen?

Reason #2: People are living longer.

29

Historical trends in female life expectancy, 1840-2000



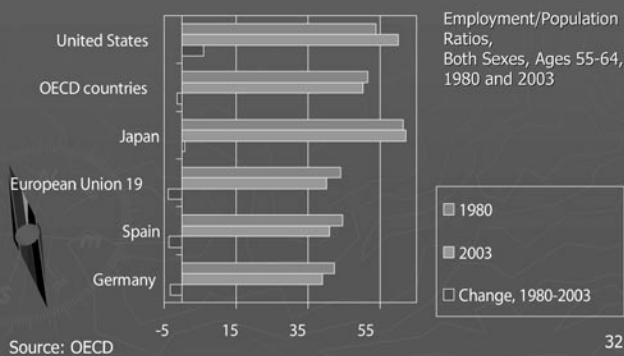
30

Why did it happen?

Reason #3: Falling workforce participation among older citizens, especially in Europe.

31

Fewer older Europeans remain at work than in earlier years



32

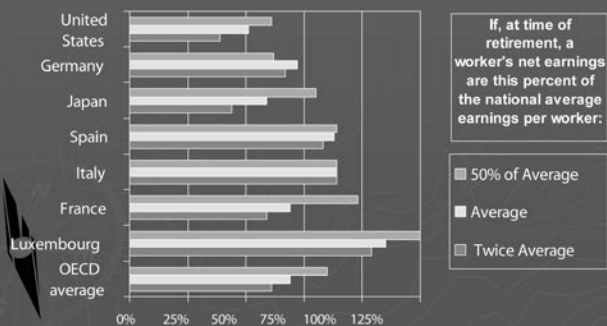
But why so many non-working older citizens?

Reason #1: Generous government pension plans

33

Why work?

Average government-guaranteed pension payment as a percent of a worker's net earnings at the time of retirement



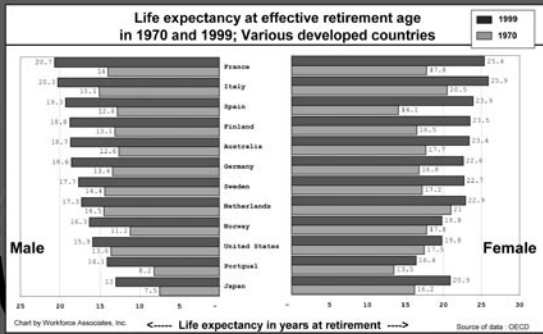
34

Why so many non-working older citizens?

Reason #2: Many more years in retirement.

35

More years in retirement



36

Fewer older men remain at work than in earlier years: More detail

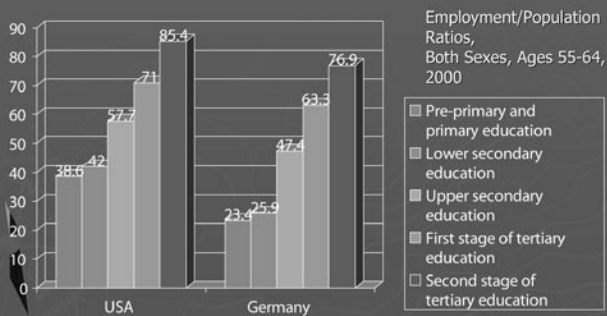
Employment/Population Ratios for Older Workers, 1980-2003

Country or Area	Ages 55-64			Ages 65+					
	Both Sexes			Men			Women		
	1980	2003	Change, 1980-2003	1980	2003	Change, 1980-2003	1980	2003	Change, 1980-2003
Germany	42.2	39.0	-3.2	64.1	47.1	-17.0	27.2	30.9	3.7
Spain	44.5	40.8	-3.7	71.3	59.3	-12.0	20.7	23.4	2.7
European Union 19	43.9	40.2	-3.8	63.6	50.2	-13.4	27.6	30.6	3.0
Japan	61.3	62.1	0.8	82.2	77.4	-4.8	44.7	47.5	2.8
OECD countries	51.5	50.1	-1.4	69.9	60.8	-9.1	35.9	39.9	4.1
United States	53.8	59.9	6.0	69.7	65.6	-4.0	40.0	54.5	14.6

Country or Area	Ages 55-64			Ages 65+					
	Both Sexes			Men			Women		
	1980	2003	Change, 1980-2003	1980	2003	Change, 1980-2003	1980	2003	Change, 1980-2003
Germany	4.5	2.9	-1.6	6.8	4.4	-2.4	3.2	1.8	-1.4
Spain	7.5	1.5	-6.0	12.6	2.3	-10.2	4.0	0.9	-3.1
European Union 19	5.7	3.8	-2.0	9.3	5.8	-3.5	3.4	2.3	-1.1
Japan	25.9	19.7	-6.3	40.1	29.0	-11.1	15.5	12.9	-2.7
OECD countries	11.7	10.8	-0.9	18.4	15.8	-2.6	7.1	7.1	0.0
United States	12.1	13.5	1.3	18.4	17.8	-0.6	7.8	10.2	2.4

Source: OECD

Higher educated older people are more likely to remain at work



38

A public policy imperative

- Raise workforce participation rates among older citizens

39

But how?

Start by attacking existing counter-productive public policies.

- Eliminate mandatory retirement ages in those countries where they still exist.
- Raise the age at which workers become eligible to receive government-paid pensions.
- Abolish penalties for continued working post-retirement (where they still exist).

40



Thanks Very Much

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