
Graduate School of Development Studies

# The State, The Market and Higher Education:
## Policy convergence across comparative capitalisms:

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# List of Acronyms

OECD- Organization for Economic Cooperation and development

NSF- National Science Foundation

EU- European Union

US- United States of America

BA- Bachelors of Arts

MA- Masters of Arts

# Abstract

The decline of Keynesianism preluded the retreat of the state. In the United States market fundamentalism that rose in it's place and it began to manifest it's self as profit motive in sectors afore untouched by such. Higher education is seeing more and more as the supply side to meet skilled market labor demand. Increasingly the market orientation is incentivizing a profit motive with in higher education. Although Germany has as state coordinated higher education sector and a Coordinated Market Economy there has been significant policy movement in a market-oriented direction. This paper answer the question 'has market incentization lead the German higher educational system toward convergence with the American higher education system?' The Varieties of capitalism literature is utilized to determine the degree of convergence. Although there are significant elements of neoliberal policy coming to bare, this paper finds that the structures, institutional complementarities, state coordinated higher education sector and Germany Coordinated Market Economy provide structural barriers for stop sudden transition. The principles of the system are still the same and appear capable and willing to resist the tide of market influence and the pure economistic interpretation of the role of higher education.


## Relevance to Development Studies

Education is one of the building blocks for any society. As education is curbed to serve the market it maybe at the expense of society and democracy. The higher education sector in Germany and the United States are arguable two of the best in the world. These countries set discourses, ideologies and create waves that will effect all of those less capable to fending off market forces with in their domestic political economy and their domestic higher education sector.


## Keywords

Higher Education, Labor Market, Varieties of Capitalism, Tertiary Education, Germany, United States, Higher Education Policy, Neoliberalism, Marketization

# Introduction

Since the decline of Keynesianism the state, in many countries, has been on the retreat. The coordination and distribution mechanism, which came to fill the role has been the market. In the United States, where the state never had a significant role in the higher educational sector, we begin to see the introduction of a profit motive. There is a strong incentives and deincentives for institutions of learning to maximize revenue and cut cost. This moves hand in hand with a fundamental belief that higher education is the supply side for skilled labor demanded from the market. The exclusivity of the neoliberal process invalidates all input or critique that do not work from within a rigid market framework. In this paper Germany and the United States will be investigated to determine if market incentization has lead the German higher education system toward convergence with the American educational system. The presumed hypothesis is that there is no convergence. This paper will attempt to investigate this question by first peering into the economistic literature regarding the higher education and labor market nexus. The salient variables that come out of the literature will be explored, as well as the implications for this framework on higher education generally. The first chapter will conclude that the marketization of higher education comes with a framework, which is incapable of understanding that economic value and social value are not necessarily constitutive or complementary. A discussion of neoliberalism's philosophical underpinning and rise to power will follow. The contemporary American higher educational system will be vetted for symptoms of further marketization, and Germany's recent neoliberal policies within skill formation will also be discussed. The Varieties of Capitalism literature will be utilized as an approach with tools for looking into to the mechanism of political economic coordination within the American and Germany systems. This framework will be called on to look into the research question specifically and to either prove or disprove the hypothesis.

## 1.1 Chapter 1- Nexus: Labor Market and Higher Education

### *Chapter 1- Introduction*

This chapter will explore the some of the similarities and some of the differences between the German and American higher educational systems, as well as their methods of coordination. The education and economic nexus is necessary to investigate if we wish to attempt to understand the connections between institutions in transition (Brinton 2005: 575; DiPrete 2007 in Powell and Solga 2008). In this chapter the contemporary trends within the higher education and labor market nexus will be investigated. The literature indicates contemporary trends such as 'over supply' of tertiary graduates, 'over

education' of graduates, 'mis-match' between field of study and labor market match, possible shortages in science and technology fields, and the question of institutional value, which system hold better economic return. This chapter will explore degree field participation with in Germany and the United States. The literature is dominated by an economistic supply and demand framework, which will be utilized to discuss the nexus. Higher education is increasingly being seen as the supply side for market labor needs. This view and academic pursuit is serving to invalidate opposing views or values for higher education. For this reason we will explore the nexus from within the exclusive supply and demand framework. The chapter will conclude with a reflection on the supply and demand framework, a discussion of the impact of cutting away the arts and humanities and the potential impacts for critical thought and, therefore, society and democracy. This chapter will point out that economic value and social value are not necessarily constitutive or complementary.

## *Description of the German and American Higher Educational System*

Jacob and Weiss (2010) report that the tertiary education system in Germany and the United States differ in various ways and demonstrate substantially different patterns in education choices and enrolment patterns throughout life. For example, the German higher education system is stratified into several parallel tracks of different fields of study that lead to one level of final graduation. In contrast, the American higher education system is stratified more diversely and sequentially with more flexibility between different tracks. The Bologna process introduced to Germany an element of sequential stratification in the Bachelor's and Master structure, which will be discussed in some detail in chapter 2. Both Germany and the United States are highly industrialized economies with a large and growing need for highly skilled labor. Both countries also widely expanded education in the last 60 years. There are, however, substantial differences in the historical development and current structure of the two educational systems.

There are some parallels between the post-World War II development of the American and German higher education institutions. However, American and German universities have different traditions in regard to their relationship with the state. A significant feature of the American system is that universities have autonomy in admissions, accreditation and awarding degrees, which has come to create a hierarchy, or prestige, differential between institutions. German universities are state-controlled, with the state mandating rules for admission and the awarding of degrees. The German system is characterized by homogeneity, and a horizontal hierarchy between universities. In the United States, institutions are accredited through non-governmental, not-for-profit institutions, which are given authority by the Department of Education but are not funded by the federal government. The educational institution pays the accrediting body to be vetted for accreditation. In the United States, contrary to most European countries, the academic higher education

institution as a whole is accredited and, as such, can offer any degree they wish, which is more informal than the German system. However, in the US more speciality skill professions such as Law, Medicine, Nursing, or vocational education programs are accredited by either the state or a specific agency that accredits the national field for that skill[1]. German universities are controlled by the states in which they are located. Funding is provided by the federal government to the states for allocation.

**Germany**

Jacob and Weiss (2010) indicate that the formal requirements for tertiary education entry in Germany are (1) the successful completion of upper secondary education and (2) obtaining either the 'Arbitur' or a vocationally oriented 'Fachhochschulreife', which function as a school graduation certificate and a university entrance exam. The 'Arbitur' provides access to all university courses, while the 'Fachhochschulreife' provides access only to the 'Fachhochschulen', technical universities of applied sciences. As Hillmert and Jacob (2003) point out, another major characteristic of post-secondary education in Germany is the intermediate non-tertiary alternative of gaining vocational training through apprenticeships and vocational schools. Vocational training is not part of the tertiary education system in Germany; however, it offers good labor market prospects. Heine et al. (2007 in Jacob and Weiss 2010) report that in 2006 only 16 percent of secondary graduates with the 'Arbitur' reported not wanting to enter higher education, which also suggests that 'Arbitur' students come from a somewhat similar background. Goedegebuure et al. (1996) call the German higher education system "binary stratified", as it is a two tier system with university and 'Fachhochschule', or universities of applied sciences, a less academic tertiary institutions which focuses on technical skills and applied sciences while academic universities offer courses in all fields of study. Jacob and Weiss (2010) suggest that universities are considered to be relatively equal in quality, demonstrating no strong hierarchy among universities. Kupfier (2011) argues that, due to this horizontal structure, multinational corporations have a broader pool from which to hire employees. Hartman (2006) reports that the top 100 executives in Germany came from 22 of the 50 universities.

Until just a few years ago, there were no tuition fees in public institutions of higher education. Germany is a typical case of parallel but not sequential stratification within higher education. Universities, before Bologna, required 5 years of education. The 'Fachhochschule' require at least 4 years to obtain a degree. Jacob and Weiss (2010) conclude that this length of study makes tertiary education a large investment and could be seen to limit flexibility. In 1998, the Bachelor of Arts (BA) and Master of Arts (MA) degrees were

[1] *See United States Department of Education on accreditation for full explanation: http://ope.ed.gov/accreditation/*

introduced in Germany, through the Bologna process. The BA and MA degrees, however, are still not well accepted. Kretchmann (2008) analyzed surveys from 2002, 2004 and 2005 and found that working class students were skeptical and insecure about employers who accepted the BA. Previously, Germany offered Diploma and Magister degrees. Germany has about 70 universities, which offer degrees up to a Ph.D., 13 universities of technology, which have official full university status but focus on natural sciences, and approximately 203 'Fachhochschule' universities of applied science and arts, which include engineering, computer science, business and management, arts and design, communication studies, social services and other professional fields. 'Fachhochschule' cannot grant PhDs, while the two types of universities can. From 1972-2006, public universities did not charge tuition. However, since 2006, fees have been introduced but only at the post-graduate levels.

**The United States**

The Organisation for Economic Cooperation and Development (OECD) (2007) reports that the only formal requirement to enter higher education in the United States is a high school degree or a General Equivalency degree (GED). It is an interesting counterexample to Germany: while there are low selectivity criteria to enter higher education, they are balanced by a higher selectivity by institution, which is based on a prestige hierarchy that does not exist in Germany. Geiger (1996) describes the American institutional setting as mainly two-tier, while the many others classify it as 'diversified' in terms of stratification. The first tier is comprised of research universities, which have selective admission criteria, typically offering liberal arts and scientific education and granting bachelor, master and doctoral degrees. Thelin (2004 in Jacob and Weiss 2010) characterizes the second tier as the community college level. Community colleges were introduced to increase participation and are relatively heterogeneous institutions that serve different functions. Within the US system community colleges offer two-year associate degrees, and provide transfer opportunities to universities, as well as terminal skill specific, which Thelin calls vocational, education. Community colleges offer an associates degree in two years, while a university offers a bachelors degree in four years. It is somewhat common for individuals who obtain an associates degree to transfer to a university and complete a bachelor degree in an additional two years. Community colleges aim to gain competitive advantage for students, particularly non-traditional student, e.g. offering part-time classes. In comparison with Germany, community colleges are a part of tertiary education in the United States but in some aspects they serve similar functions as the apprenticeship system in Germany, which provides vocational degrees (Jacob and Weiss 2010; 253). Universities and community colleges form a clearly sequential system. Jacob and Weiss (2010) indicate that the financial situation of American colleges depends largely on private funding from tuition fees and donations. Roksa (2007 in Jacob and Weiss 2010) concludes that the American system of higher education can be described as market-coordinated, as there is very minor intervention by the government. State intervention in the United States is concentrated in the area of monetary support for students, predominantly through student loans and small grants. Data from the U.S. Department of Education indicate that in 2007 there were 4,861 colleges and

universities with 18,248,128 enrolled students. The Department of Education estimates that close to 70 percent of all undergraduate students attend public institutions, which includes undergraduates at two-year community colleges and four-year colleges and universities.

## 1.2 Trends within the nexus: higher education and the labor market

### *Oversupply*

The OECD Country Background Report and OECD Education at a Glance report indicate that tertiary education has grown in all OECD countries in the last 20 years. Machin and McNalley (2007) report that the wage premium attached to higher education has increased in most countries. All countries showed a positive return to tertiary education, relative to labor market returns for an individual without a degree. Therefore, in no case can we speak to 'over-supply' of tertiary graduates. There is a positive and increasing trend of returns to tertiary education, which suggests that 'under-supply' is more of an issue. In many countries, there has been some ground gained by less educated groups over the last decade. Machin and McNally (2007) report that individuals with tertiary education have a much higher probability of being employed than those without tertiary education. The OECD Education at a Glance study reports that in 1994 23 percent of Germany's working age population (aged 25-64) had attained tertiary education, as compared to 24 percent in 2003. In contrast, in 1994 in the United States, 32 percent of the working age population had attained a tertiary degree, compared to 38 percent by 2003. Despite the increase in tertiary-level education in many countries, most countries still lag behind the United States in the percentage of workforce age population that has a tertiary education.

### *Over Education and Skill Mismatch*

'Over-education' and 'under-education' are previlant variable in the empirical literature investigating higher education and labor market returns. Over-education refers to an individual who holds higher qualifications than is required by the individual's job. Under-education arises when an individual has lower qualifications than are required by the individual's job. Skill mismatch is a general term for not being adequately skilled for you position, weather educated in a different field, or over or under-educated within the same field. The effect of over-education on earnings is consistent over time and across countries (Machin and McNalley 2007; 24). Tsai (2010) reports that the positive relationship between earnings and education is not applicable to over-educated workers, i.e. over-education causes wage penalties in labor market returns. There is substantial quantitative literature regarding the widespread problem of over education in the United States and Europe. Daly, Buchel and

Duncan (2000) reported that 14 percent of the 1984 wave of the German Socio-Economic Panel had more education than their jobs required. Numbers in the United States vary. Verdugo and Verdugo (1989) report 11 percent of the workforce is over-educated, while Tsang, Rumberger, and Levin (1991) report 50 percent. Vaisey (2006) reports that, since 1972, the incidence of over-qualification has substantially increased within all social segments. He also reports that the effects to be significant for a diverse field of outcomes and that the effect has not lessened over time. Dolton and Vignoles (2000) note that graduates with engineering, technical or science degrees are less likely to be over-educated than graduates in social sciences, arts and languages. Most studies, however, use separate definitions of required schooling, temporal considerations and data sets.

Three different approaches to collecting data are explored in the over-education/ skill-mismatch literature. One approach comes from the view of 'work-study experts' who decide the skill level necessary for an occupation. A second approach uses survey data from jobholders to determine their view of the qualifications required for that position. The third approach is to calculate the average level of education within an occupation to qualify as 'over' or 'under' educated (S. Machin and S. McNally 2007; 24). For detailed articulation on the measurements and approaches, see Groot and Maassen van den Brink (2000).

There are significant and apparent problems with all three of the approaches to quantifying 'over' and 'under' education. A general academic university education may not easily be superimposed onto the requirements of a job. Human capital acquired in a general academic degree, e.g. analytical ability or critical thought, may not be easily quantifiable. In addition, although general human capital may not be necessary for a particular job, it makes the jobholder more productive then he or she would have been without it (Machin and McNally 2007; 25). Wasmer et al. (2006 in Machin and McNally 2007) indicate that workers identified as 'over-educated' may well be matched appropriately if their productivity is lower because of unobserved characteristics, such as the individual's ability in relation to other workers at the same educational level. Workers with lower abilities are more likely to be observed and quantified as over-educated. The academic work that measures over or under-education only considers one dimension of the 'match'. Tsai (2010) reports that the significant wage penalties correlated within the literature with over-education in workers is due to ignoring the non-random assignment of workers to jobs, as well as productivity differences such as individual capability. Albrecht and Vroman (2002) and Dolado et al. (2004) show that with rapid structural change and limited adaptability of workers skill sets particular skill groups end up working in the 'wrong' sector. McIntosh (2005) links skill-mismatch with over-qualification. He indicates that the real problem may be that graduates of tertiary-level educational institutions do not have the skills needed by employers and are, therefore, measured as over-qualified for the jobs they are able to get.

In regressions controlling for sector, occupation and year, Wasmer et al. (2006 in Machin and McNally 2007) found that, in the countries studied (France, Germany, Italy, Spain and the United Kingdom), the likelihood of being over-qualified declined with labor market experience in the countries studied. This finding supports the premise that over-qualification is transitory. In regressions controlling for gender, marital status, household size, experience, and labor market history, Wasmer et al. (2006 in Machin and McNally 2007) found that if an individual does have appropriate skills but is over-qualified, being over-qualified does have a wage penalty. The wage penalty, however, is only about 1%. They find that skill mismatch has a higher wage penalty. In Germany, Wasmer et al. (2006) found that there was no wage penalty to over-qualification (S. Machin and S. McNally 2007; 27).

The view of over-education as a transitory phenomenon varies both by study and by country. Machin and McNally (2007) argue that one generalization that can be made is that observing that over-qualified individuals in the workforce does not mean that there is an over-supply of tertiary educated graduates. They conclude that if there was an over-supply, then relative wages and employment probabilities would fall to the level of their closest substitutes, which has not happened. Wasmer et al. (2006 in in Machin and McNally 2007) argue that skill-mismatch is a more serious problem than over-qualification, and that the two are correlated.

### *Field of Study*

Machin and Puhani (2006) investigated the issue of returns to higher education by degree subject in the United Kingdom, France, Germany, and the United States. Degree type was divided into four categories: Arts; Science/Engineering/Technology; Social Science; Rest/Combined (Including Medicine, Education, Language…).

**Table I**
Tertiary Graduates by Subject- Change Over Time- Men

| | % tertiary graduates by degree type | | Estimated wage return (relative to Arts) | |
|---|---|---|---|---|
| | **1993** | **2000** | **1993** | **2000** |
| **Britain** | | | | |
| Arts | 14 | 15 | -- | -- |
| Science/Engineering/Technology | 39 | 39 | 0.18 | 0.25 |
| Social Science | 29 | 29 | 0.12 | 0.21 |
| Rest/Combined (incl. Medicine, education) | 17 | 17 | 0.17 | 0.17 |
| Observations | 2,153 | 9,420 | 1,357 | 2,868 |
| **France** | | | | |
| Arts | 13 | 13 | -- | -- |
| Science/Engineering/Technology | 37 | 42 | 0.31 | 0.20 |
| Social Science | 29 | 32 | 0.37 | 0.18 |
| Rest/Combined (incl. Medicine, education) | 21 | 13 | 0.40 | 0.24 |
| Observations | 576 | 4,892 | 353 | 3,470 |
| **Germany** | | | | |
| Arts | 7 | 6 | -- | -- |
| Science/Engineering/Technology | 41 | 43 | 0.19 | 0.25 |
| Social Science | 28 | 26 | 0.15 | 0.20 |
| Rest/Combined (incl. Medicine, education) | 24 | 25 | 0.18 | 0.20 |
| Observations | 13,479 | 14,980 | 11,257 | 12,358 |
| **United States*** | | | | |
| Arts | 13 | 14 | -- | -- |
| Science/Engineering/Technology | 24 | 25 | 0.34 | 0.35 |
| Social Science | 42 | 41 | 0.30 | 0.34 |
| Rest/Combined (incl. Medicine, education) | 21 | 20 | 0.17 | 0.16 |
| Observations | 78,087 | 50,926 | 60,433 | 36,557 |

* Data in later period refers to 2003
Source: Machin and Puhani (2006b)

*Source:* Machin and Puhani 2006

Machin and Puhani (2006) show that the Arts comprise 13-15 percent of the degrees attained in Britain, France and the United States. The level of attainment has remained relatively stable over the two periods of observation, with an increase of 1 percentage point in the United States and a decrease of 1 percentage point in Germany. The US has twice the percentage of graduates from the Arts.

Science/Engineering/Technology comprises the largest degree field, by percentage of graduates, in Britain, France and Germany. The field accounts for approximately 40 percent of male graduates**,** while the United States the field accounts for approximately 25 percent of male graduates. Between 1993 and 2000, the returns to Science/Engineering/Technology increased by 6 percentage points in Germany, 1 percentage point in the United States, relative to an Arts degree.

In Germany, Social Sciences decreased by 2 percentage points between 1993 and 2000, while Science/Engineering/Technology increased by the same amount. The returns in Germany increased by approximately 5 percentage

points in both degree fields. Wage returns also increased for Rest/Combined in Germany, which is the only such degree field example within the study. Social Sciences also fell in the United States, by 1 percentage point, while wage returns increased from .30 to .34, relative to an Arts degree. The most dramatic difference was in the overall percentage of Social Science graduates. In the United Kingdom, Social Science was 29 percent of the degrees completed and stable across observation periods. In France, there was a slight increase; Social Science was about 30 percent of the degrees issued. In Germany, Social Science accounted for 26 (2000) percent of the degrees issued. These figures stand in stark contrast to the United States, in which approximately 40 percent of the tertiary graduates study Social Sciences.

The overall wage returns, of European countries by degree field in 2003, fluctuates less than .05. However, in 1993 the same was not true. There was significantly greater disparity among countries and between degree fields. If the 1993 French data is anomalous within the presented data set, the number of obervations for the period of skewing is significantly inferior to all other data sets. The United States has distinctly higher wage returns relative to the Arts, in Science/Engineering/Technology and Social Science between .30 and .35. Rest/Combined shows approximately half the return during both observation periods. This figure could indicate either that labor market returns in the two aforementioned degree fields are distinctly higher in the United States or, more likely, that an Arts degree is worth substantially less in the United States than in Europe.

**Table II**
Tertiary Graduates by Subject- Change Over Time- Women

| | % tertiary graduates by degree type | | Estimated wage return (relative to Arts) | |
|---|---|---|---|---|
| | **1993** | **2000** | **1993** | **2000** |
| **Britain** | | | | |
| Arts | 33 | 27 | -- | -- |
| Science/Engineering/Technology | 17 | 15 | 0.02 | 0.16 |
| Social Science | 30 | 29 | 0.02 | 0.10 |
| Rest/Combined (incl. Medicine, education) | 20 | 28 | 0.08 | 0.18 |
| Observations | 1,337 | 7,291 | 631 | 1,881 |
| **France** | | | | |
| Arts | 35 | 32 | -- | -- |
| Science/Engineering/Technology | 21 | 20 | 0.21 | 0.12 |
| Social Science | 26 | 34 | 0.22 | 0.08 |
| Rest/Combined (incl. Medicine, education) | 18 | 14 | 0.20 | 0.14 |
| Observations | 411 | 4,262 | 186 | 2,544 |
| **Germany** | | | | |
| Arts | 16 | 13 | -- | -- |
| Science/Engineering/Technology | 12 | 12 | 0.09 | 0.09 |
| Social Science | 26 | 23 | 0.07 | 0.05 |
| Rest/Combined (incl. Medicine, education) | 46 | 52 | 0.14 | 0.07 |
| Observations | 7,068 | 8,844 | 3,266 | 4,461 |
| **United States*** | | | | |
| Arts | 19 | 17 | -- | -- |
| Science/Engineering/Technology | 8 | 10 | 0.21 | 0.18 |
| Social Science | 27 | 31 | 0.17 | 0.14 |
| Rest/Combined (incl. Medicine, education) | 46 | 42 | 0.06 | 0.02 |

*Source:* Machin and Puhani 2006

In Table **II** we see female tertiary degree attainment change over time by field of study. There are macro level trends, which illuminate a distincly lower wage return across the board for women than for men (cf. Table 1.2.4a). Also, approximately 30 percent of women in Britain and France complete Arts degrees. Similar trends are seen in the United States and Germany in the Rest/Combined category, which includes medicine, education and languages- all standing examples as the most participate degree field by country relative to the year of obersvation.

Between 1993 and 2000, there was a marginal reduction of 3 percentage points in the fields of the Arts and Social Science in Germany. There was a wage return decline of .02 during the same period. Science/Engineering/Technology remained the same at 12 percent of female degree achievers and .09 wage returns relative to the Arts. There was an increase of 6 percentage points in the Rest/Combined category, which resulted in 52 percent of degree achievers in 2000, while the wage return halved from .14 to .07. These figures indicate either an over-supply of graduates within this degree field or a structural change in the relevant economic sector.

The United States saw a decline of female participation by 2 percentage points in the Arts and 4 percentage points in Rest/Combined. In addition, Rest/Combined showed diminished wage returns relative to the Arts, from .06 to .02. This figure indicates poor pay for females relative to their male counterparts in Social Science and Science/Engineering/Technology at approximately half the wage return, which both showed a decline of .03 between the periods observed.

The Science/Engineering/Technology field in the United States shows twice the wage return as in Germany for female graduates; Social Science shows nearly three times the wage return. Germany shows half the percentage of Social Science graduates as the rest of the countries studied. During the observation period, overall wage returns to women in Germany fell by .07 and by .10 in the United States. Rest/Combined is the most popular field. However, it shows drastically diminishing returns and likely has an over-supply of graduates. A small percentage of women, 12 percent in Germany and 8-10 percent in the United States, engage in Science/Engineering/Technology but they show the highest wage returns. Between a quarter to a third of women in the United States and Germany study Social Science, and both countries are showing diminishing returns. Of the four countries studied, the highest return to Science/Engineering/Technology was in the United States. However, in all countries other than France, the smallest category of female graduates is in Science/Engineering/Technology. In this category, there has been only a slight change in classification over the periods considered in the data.

As a corollary to the data on male degree achievement, one can infer that an Arts degree has the lowest relative rate of return for female and male graduates**.** This is the case in all countries studied during both 1993 and 2000. The data does indicate that the difference between the return of an Arts degree and the return to any other degree type is not reported to be as large for women as for men. Other studies, such as Powdthavee and Vignoles (2006), have indicated that a zero wage return exists in the United Kingdom for Arts and Humanities graduates relative to non-graduates. Which would reinforce the conclusion that the US has a very low wage remuneration for Arts relative to other subjects, explaining the relatively high other wage returns. The differential presented in the chart indicates that there is a much larger earning differential between Arts and other degrees than between other degree types. This finding is valid during both the 1993 and 2000 periods of study.

The data shows a small difference in earnings between an Arts degree and Rest/Combined. There was little change over the times indicated, which suggests an improvement in the return to Arts graduates. Across time, gender and degree field returns to a university degree are lowest for Arts subjects. The returns are highest for men in Science/Engineering/Technology. Machin and Puhani (2006) illustrate that there can be large differences in the rate of return of an academic tertiary degree across subject areas. The data suggests that although there is some reaction to change relative to returns, by individuals choosing degree fields, this change occurs slowly

*Shortage of Science and Technology Graduates*

There is a large differential between the returns to Science/Engineering/Technology relative to other subjects, particularly for men. This demonstrates the high value placed on the field by employers. It also indicates the high relative demand for graduates in this degree field. This differential in wage returns could be interpreted as a shortage of Science and Technology graduates (Machin and McNally 2007; 32). In fact, shortages are reported in several OECD countries (OECD Country Background reports). The National Science Foundation **(2004)** produced data comparing countries by proportion of graduates with a Science and Technology degree through a cohort analysis, see **Annex A.** Dolton and Vignoles (2000) conclude that graduates with engineering, technical or science degrees are less likely to be over-educated than graduates in the social sciences, arts and languages. In Table **1.2.5** the description of 'short' degree paths refers to a vocational training lasting less than 5 years, where the system is binary.

## Table III
## 24 year old Cohort analysis of first time degree earners by country in the sciences and engineering

**university degrees and ratio of first university degrees and S&E degrees to 24-year-old population in selected locations, by region: 2000 or most recent year**

| /location | All first university degrees | All S&E | Natural sciences[a] | Mathematics/ computer sciences | Agricultural sciences | Social/ behavioral sciences[b] | Engineering | 24-year-olds | First university degrees | NS&E degrees | Soc behavio scie degr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | | | | | | | | Ratio to 24-year-old population[c] | | |
| ions[d] | 7,438,071 | 2,838,044 | 699,110 | 177,387 | 106,601 | 847,920 | 1,007,026 | 74,233,401 | 10.0 | 2.7 | |
| a[d] | 2,528,607 | 1,176,103 | 275,969 | 23,810 | 42,316 | 356,203 | 477,805 | 46,635,694 | 5.4 | 1.8 | |
| Cambodia[e] | 2,905 | 525 | 106 | 125 | 68 | 148 | 78 | 157,000 | 1.9 | 0.2 | |
| China (2001) | 567,839 | 337,352 | 63,517 | NA | 19,005 | 35,267 | 219,563 | 19,639,000 | 2.9 | 1.5 | |
| Hong Kong (1995) | 11,362 | 5,425 | 2,370 | NA | NA | 1,233 | 1,822 | 104,000 | 10.9 | 4.0 | |
| ndia (1990) | 750,000 | 176,036 | 147,036 | NA | NA | NA | 29,000 | 17,700,800 | 4.2 | 1.0 | |
| ndonesia (1997) | 144,314 | 97,095 | 10,711 | NA | NA | 65,740 | 20,644 | 4,125,800 | 3.5 | 0.8 | |
| Japan (2001) | 542,314 | 359,019 | 14,192 | 4,965 | 14,084 | 221,300 | 104,478 | 1,719,400 | 31.5 | 8.0 | 1 |
| Kazakstan (1995) | 45,536 | 13,252 | 6,779 | NA | NA | 952 | 5,521 | 290,600 | 15.7 | 4.2 | |
| Laos | 1,762 | 389 | 63 | 30 | 100 | 23 | 173 | 94,000 | 1.9 | 0.4 | |
| Malaysia (1990) | 10,511 | 4,760 | 1,685 | NA | NA | 2,198 | 877 | 406,800 | 2.6 | 0.6 | |
| Singapore (1995) | 5,599 | 5,599 | 2,103 | NA | NA | 1,820 | 1,676 | 49,600 | 11.3 | 7.6 | |
| South Korea | 209,747 | 96,859 | 13,427 | 9,299 | 5,859 | 11,766 | 56,508 | 783,600 | 26.8 | 10.9 | |
| Taiwan (2001) | 117,430 | 48,624 | 3,684 | 9,391 | 3,200 | 5,762 | 26,587 | 385,894 | 30.4 | 11.1 | |
| Thailand (1995) | 119,288 | 31,168 | 10,296 | NA | NA | 9,994 | 10,878 | 1,179,200 | 10.1 | 1.8 | |
| ope[d] | 2,348,771 | 836,456 | 230,506 | 70,003 | 24,568 | 173,240 | 338,139 | 9,844,745 | 23.9 | 6.7 | |
| European Union | 1,330,025 | 477,973 | 112,797 | 60,763 | 16,738 | 107,746 | 179,929 | 4,903,035 | 27.1 | 7.6 | |
| Austria (short) | 1,662 | 744 | 0 | 46 | 0 | 0 | 698 | 92,400 | 16.4 | 4.5 | |
| Austria (long) | 13,470 | 4,434 | 752 | 476 | 236 | 1,057 | 1,913 | NA | NA | NA | |
| Belgium (long) | 22,526 | 8,211 | 1,451 | 519 | 498 | 2,396 | 3,347 | 125,200 | 18.0 | 4.6 | |
| Denmark (1998) | 11,951 | 4,962 | 1,882 | 209 | 171 | 1,925 | 775 | 65,000 | 18.4 | 4.7 | |
| Finland (short) | 13,441 | 4,662 | 37 | 356 | 391 | 198 | 3,680 | 65,600 | 38.5 | 13.2 | |
| Finland (long) | 11,828 | 5,521 | 958 | 490 | 141 | 1,319 | 2,613 | NA | NA | NA | |
| France (short) | 226,314 | 91,030 | 33,511 | 13,910 | 95 | 31,057 | 12,457 | 762,200 | 36.1 | 11.2 | |
| France (long) | 49,002 | 25,130 | 0 | 1,132 | 2,162 | 0 | 21,836 | NA | NA | NA | |
| Germany (short) (2001) | 56,681 | 25,868 | 487 | 1,165 | 960 | 60 | 23,196 | 892,800 | 20.0 | 6.4 | |
| Germany (long) (2001) | 121,937 | 39,295 | 11,029 | 6,139 | 1,180 | 7,824 | 13,123 | NA | NA | NA | |
| Greece (long) | 18,556 | 4,576 | 2,570 | NA | NA | 221 | 1,785 | 155,000 | 12.0 | 2.8 | |
| Iceland (short) | 1,318 | 354 | 72 | 58 | 9 | 122 | 93 | 4,200 | 31.4 | 5.5 | |
| Ireland | 18,669 | 6,636 | 2,231 | 1,405 | 196 | 790 | 2,014 | 69,000 | 27.1 | 8.5 | |
| Italy (short) | 11,568 | 3,729 | 147 | 740 | 102 | 59 | 2,681 | 726,600 | 20.7 | 5.9 | |
| Italy (long) | 139,109 | 53,534 | 8,738 | 4,087 | 1,243 | 14,462 | 25,004 | NA | NA | NA | |
| Netherlands (short) | 66,932 | 17,586 | 2,185 | 1,278 | 1,336 | 5,461 | 7,326 | 187,000 | 37.3 | 6.8 | |
| Netherlands (long) | 2,877 | 607 | 52 | 57 | 75 | 0 | 423 | NA | NA | NA | |
| Portugal (short) | 2,587 | 425 | 70 | NA | NA | 32 | 323 | 160,200 | 16.3 | 2.8 | |
| Portugal (long) | 23,482 | 7,823 | 1,895 | NA | NA | 3,685 | 2,243 | NA | NA | NA | |
| Spain (short) | 87,464 | 23,302 | 0 | 4,606 | 3,236 | 0 | 15,460 | 637,200 | 32.6 | 8.1 | |
| Spain (long) | 120,114 | 42,511 | 10,908 | 4,404 | 1,503 | 13,975 | 11,721 | NA | NA | NA | |
| Sweden (short) | 32,573 | 11,475 | 1,256 | 1,263 | 178 | 1,892 | 6,886 | 102,200 | 33.4 | 9.5 | |
| Sweden (long) | 1,524 | 379 | 0 | 0 | 53 | 278 | 48 | NA | NA | NA | |
| United Kingdom[g] (2001) | 274,440 | 95,180 | 32,570 | 18,420 | 2,970 | 20,930 | 20,280 | 696,600 | 39.4 | 10.7 | |
| erica[d] | 1,907,776 | 622,870 | 140,020 | 64,961 | 24,274 | 259,393 | 134,222 | 11,628,603 | 16.4 | 3.1 | |
| North America | 1,531,958 | 500,391 | 97,532 | 64,569 | 23,268 | 219,134 | 95,888 | 6,491,403 | 23.6 | 4.3 | |
| Canada | 116,160 | 53,307 | 10,353 | 5,424 | 1,236 | 26,660 | 9,634 | 397,200 | 29.2 | 6.7 | |
| Costa Rica | 4,393 | 1,074 | 104 | 214 | 167 | 264 | 325 | 70,600 | 6.2 | 1.1 | |
| Cuba | 16,769 | 3,374 | 1,009 | 219 | 384 | 408 | 1,354 | 201,800 | 8.3 | 1.5 | |
| Mexico | 135,233 | 42,049 | 1,701 | 9,589 | 3,237 | 3,338 | 24,184 | 2,038,406 | 6.6 | 1.9 | |
| Nicaragua (1997) | 6,282 | 1,965 | 834 | NA | NA | 276 | 855 | 80,397 | 7.8 | 2.1 | |
| United States | 1,253,121 | 398,622 | 83,531 | 49,123 | 18,244 | 188,188 | 59,536 | 3,703,000 | 33.8 | 5.7 | |

***Source: Abstract A -Source: Science & Engineering Indicators – 2004***
***http://www.nsf.gov/statistics/seind04/append/c2/at02-33.xls***

By comparing continents in 2000, one can see that Asia has the highest percentage of graduates within Science and Technology, with 32 percent of the graduates. Europe has 28 percent graduates and North America has 18 percent of the graduates within this field. South America has 22 percent of the graduates and Oceania 22 percent (See Appendix **A**). Within the continent of Asia, China has 53 percent of graduates with a degree in Science and Technology. There are twice as many graduates in the EU as in China, yet China has 80 percent of the Science and Technology graduates relative to the EU. Within the EU, France (51%) and Germany (46%) have a relatively high share of Science and Technology graduates. Data indicating the changes over time was not available for all countries. In Germany, almost all of those completing the short program obtain engineering and science, non-social and behavioral, degrees with less than 1 percent deviation. The German long program has a more even distribution with 20 percent of science graduates in the Social Sciences, about 25 percent in Engineering, about 25 percent in natural sciences, and about 20 percent in Mathematics/Computer Science/Agricultural science. Twenty percent of 24-year-olds have a tertiary degree in Germany. 6.4 percent of that 20 percent are in the natural sciences and engineering fields and approximately 1 percent in the Social and Behavioral sciences. 7.3 percent of the 20 percent of graduates study in the sciences and engineering. In the United States, 33.8 percent of 24-year-olds have a tertiary degree. 5.7 percent of those graduates are in the natural sciences and engineering fields and 5.1 percent are in the social and behavioral sciences, which accounts for 1/3 of the degrees. The United States has many more social and behavior science graduates than Germany, while Germany has many more engineering graduates, relative to their population differences.

Table **I/II** would indicate that approximately 50 percent, averaging across gender and in both US and Germany, of labor-aged tertiary graduates have a degree in the science, engineering, technology, or social sciences fields. The NSF data, however, would suggest that the figure is about 30 percent. This disparity could be due to the NSF data being a cohort-oriented analysis of 24 year olds, while the Machin and Puhani (2006) data is a sample of adults with no age restrictions. Either younger tertiary graduates are less likely to study social science, natural science, technology and engineering than the aggregate adult age grouping, or the data sets are contradictory. A considerable factor may be gender, as women are markedly more likely to study outside of the aforementioned subjects and most likely – in the United States and Germany - to study education, medicine and language (see 1.2.4b). Another factor to consider could be that some individuals return to higher education to study a more practical oriented degree later in life, after initial labor market entry. The NSF data indicates that approximately 30 percent of 24-year-old tertiary graduates, in Germany and the US, study sciences or engineering, including social and behavioral science.

*Considering Science and Technology Shortage*

There have been claims of scientific and engineering shortages in the United States since the 1950s. The counterargument is that in any market-clearing transaction where wages equilibrate demand and supply, there is not shortage or surplus. Those who support the shortage argument include Arrow and Capron (1959), who see the shortage as a result of sluggish wage adjustment; Freeman (1976), who focuses on the cyclical natures of shortages and surpluses through a cobweb model of market adjustment; and Diebolt and Murr (2004). Freeman (2005) regards engineering as the largest Science and Engineering occupation. He suggests, that tight labor markets generate large increases in supply, which depress the labor market for approximately 4-5 years, and are not distinct to Engineering. Freeman (2005) also points out that law and medical school graduates are making returns at an increasing rate relative to scientists and engineers. This finding contradicts the trend of increasing demand for science, engineering and technology skills with the ever-growing sophistication of technology within the global marketplace. Freeman (2005) also reports that wages have not increased at an expected pace because of the huge flow of immigrants to the United States who specialize in these areas. He argues that there is no evidence of a shortage of scientists and engineers in the market. Any interruption in the flow of these skilled immigrants could significantly harm American research and development. Wasmer et al. (2006 in Machin and McNally 2007) argues that, as an aggregate, in the 1990s Europe clearly lost the race to attract international brains and saw a significant outflow of 'brains' to the United States. This may partially explain the apparent shortage of science and technology graduates in Europe. In the United States, the citizens pay fees for education, which vary greatly. In Europe, many higher education programs carry no fees or minimal fees. Europe could be understood to be a significant contributor of required skills to the United States labor market and economy as a whole. The European Commission (2003) reports that an inadequate number of highly qualified science and technology workers will be a serious hurdle to the expansion and growth of the European economy[2].

[2] *For more information on the internationalization of the science and engineering labor market and international mobility of highly skilled professionals in the sciences and engineering see Noailly et al. (2005); Freeman (2005); Wasmer et al. (2006).*

*Skill formation and Institutional type*

Countries differ greatly in their types of education institutions. Teichler (1999) reports that some countries have a 'unitary' system while others have a 'binary' system. A unitary system is clearly dominated by a single university-type institution characterized by academic approaches. He classifies the United States and United Kingdom in this category. A binary system is characterized by a duality of academic programs and institutions as well as other programs that focus on vocational or applied nature in their programs. He places Germany and The Netherlands within this category. Other important differences between countries include the public or private nature of the institution or system, whether the system is centralized or decentralized, and whether the institutions are new or well established (Teichler 1999). One could also add to this list the cost or fee to students; the availability of scholarships and grants; the availability of government-sponsored student loans; the availability of private student loans; institutional hierarchy or prestige; and for profit or non profit. One could look at the contrast between the United States and Germany. Differences in higher education returns could be the effect of institutional type and/or student characteristics, which may go into the type and specific institution. As an example, higher ability students are more likely to attend an academic program. As a result, it is difficult to know if causation is the institutions or prior characteristics, e.g. aptitude, of the individual.

Jacob and Weiss (2010) argue that institutional characteristics within higher education are important in shaping labor market outcomes. They go onto argue that the evolution of different tertiary education systems depends on the 'mechanisms of coordination' dominant in the higher education system. These 'mechanisms of coordination' are largely either state-controlled or market-based. This division is contributive on two prongs: the first is the extent to which centralized control is in operation regarding curricular and institutional issues, and the second prong is the degree to which institutions are free to develop their profile by catering for consumer demand with specific educational programs. Jacob and Weiss (2010) conclude that deregulated systems offer more flexibility for educational careers, i.e., in a market-based system, second-tier institutions and institutions with low prestige are especially likely to offer greater flexibility to acquire an advantage in attracting students. Educational systems offering standardized courses and formal comparable quality between institutions, in addition to a degree of occupational specificity, are expected to stabilize labor market entry (Jacob and Weiss 2010).. The match between educated individuals and jobs should, therefore, be better in a skill specific, standardized system such as Germany's.

Dale and Kruger (2002) find that higher college resources, tuition costs and expenditures, are reflected in wage returns to the student. Black et al. (2005) suggest that findings of positive returns to 'college quality' in the American studies may not be generalizable to countries with centralized university systems, such as Germany or much of Europe. They offer no empirical evidence to back this up, but the logic seems sound.

Wasmer et al. (2006 in Machin and McNally 2007) finds that the education system in Europe provides a more specialized curriculum as compared to the United States. They argue that the research programs are a source of growth, and the reason for the differential between the United States and Europe. Implying that the United States is capable of coping with new technologies in a more reactive way because of the more general skill formation in tertiary education. Machin and McNally (2007) attribute this difference to macroeconomic shocks. Large shocks cause or initiate a great deal of labor market turnover and sector reallocation of workers. The tradeoff between a highly specialized education and a more general educational program is in adaptability. Highly specialized education ensures the availability of highly skilled labor trained for a specific task or duty, at the cost of limited adaptability in coping with structural change. A more general educational program implies less specificity, but greater adaptability to a changing economic environment (Machin and McNally 2007; 25). Wasmer et al. (2006 in Machin and McNally 2007) and Krueger and Kumar (2003, 2004) argue that a more general education is of greater value to the economy. The authors also found that returns to academic qualifications are generally found to be higher than returns to vocational qualifications. Bassanini et al. (2006) argues, using cross-country evidence, that countries with less stratified schooling systems have workers with more versatile skills and require less training to perform a new technical process than their counterparts in countries with more stratified schooling systems, although this is admittedly not the focus of their study

*Reflection upon an economistic framework*

The literature regarding the links between higher education and the labor market is dominated by a supply and demand framework. There are two other predominant frameworks in the literature: the Human Capital approach and Bourdieu's field and habitus frameworks. Bourdieu's habitus framework is also used to frame labor market/higher education links and to critique orthodoxical supply and demand accounts of the same link. Sayer (2005) argued that work is not only about obtaining money or other material goods, but also about creating and sustaining worldviews and identities. Bourdieu's Habitus has been used by the sociology of education fields to operationalize habitus as occupational aspirations (Vaisey, 2006; 837). This framework is more agent-centric, speaking to the subjectivity of the individual operating outside of rational borders. The agent is not maximizing his or her utility but is fulfilling personal and social expectations and goals, which are derived from the agent's complex and heterogeneous social, economic, political, and cultural background. In this framework, one moves away from economics as a strict

discipline and toward sociopolitical forms of value. Value in this sense is somewhat nebulous, although common sense allows for understand, but looking at public good. Value in the supply and demand framework is price, which is indicated through wage return when investigating higher education and the labor market. The question then becomes whether there are skills and abilities that are important, even vital, to a healthy developing society and/or democracy but which hold little to no value in the market and are at risk, e.g. the arts and humanities.

## *Humanities, Critical Thought and Value*

The Humanities are academic disciplines that study the human condition using methods that are primarily analytical, critical, or speculative, as distinguished from the mainly empirical approaches of the natural sciences. These disciplines and skills are arguably the building blocks of human history, knowledge, culture, philosophy, religion, language, literature as well as creativity, visual art, performing arts, social commentary, the reimagining and reinterpreting of society, progress, and unbounded expression. The humanities' weighing of methods and approaches, as well as the reflection on self and society is the essence of critical thought. Critical thinking has been described by Eniss (2003) as "reasonable reflective thinking focused on deciding what to believe or do." Scriven and Paul (1987) described this in more detail as "the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action." Raiskums (2008) argues that within the critical social theory philosophical frame, critical thinking is commonly understood to involve commitment to the social and political practice of participatory democracy, willingness to imagine or remain open to considering alternative perspectives, willingness to integrate new or revised perspectives into our ways of thinking and acting, and willingness to foster criticality in others. These features are the building blocks of a sophisticated, democratic, and tolerant society that fosters the techniques of contestation and deliberation. Zero labor market return in the arts and humanities demonstrates a hole in the supply and demand framework, or the measure of value through remuneration. Although the value to a society is not measurable in such a manner, it would seem crucial for both social prosperity and democracy that individuals seek such paths. Few of us can imagine a history without art or music or literature; of course, these are the elements of history. The low value of humanities denotes a certain managerial 'best practice' myopthy regarding value. The Arts and Humanities have significant value to society, and thus indirectly to the economy, and no economy will subsist without a functioning society. The value of education as viewed through a supply and demand framework is incomplete.

Nussbaum (2010) stresses concern for the humanities, stating

> "*The humanities and arts are being cut away, in both primary/secondary and college/university education, in virtually every nation of the world. Seen by policy makers as useless frills, at a time when nations must discard all useless things in order to stay competitive in the global market, they are rapidly losing their place in curricula, and also in the minds and hearts of parents and children. What we might call the humanistic aspects of science and social science- the imaginative, creative aspect, and the aspect of rigorous critical thought- are also losing ground as nations prefer to pursue short-term profit by the cultivation of the useful and highly applied skills suited for profit-making* (Nussbaum, 2010; 1)".

## 1.3 Chapter 1- Conclusion

The German higher educational system differs substantively from the American system. The German system is state-led with certification and funding going through the government. It is also binary, containing an academic track and a vocational track within post secondary education. German universities have a relatively flat hierarchy. The American system, on the other hand, is unitary, market led and prestige-oriented, with certification of degrees coming through non-profit non-governmental bodies and the pupils paying more significant tuition fees. American market coordination allows for diversified higher education opportunities, through night and part-time classes, and shows greater movement between education and the labor market over adulthood. In contrast, the German system demonstrates lower returns to education once labor market entry has occurred. The labor market and higher education nexus was probed at length to investigate linkages and trends, especially within Germany and the United States. The claim of 'over supply' of tertiary graduates has shown little empirical evidence. Wage growth relative to non-degree holders is still significant, though some show it to be slightly declining. Freeman (2005) argues that over-supply may depress the labor market for approximately 4-5 years. Over-education does not mean over-supply. As the return to a tertiary degree is not returning significantly less wages, it would seem to be more of a mismatch problem. Mismatch is difficult to discuss empirically because the quantification of skills is suspect, although degree attainment does provide an image of some variety. It is hard to judge mismatch when only considering a degree in a general field. The highest wage returns in Germany and the United States are in science, engineering and technology. There is also a large wage return range between degree subjects. Germany's vocational track is mainly focused on science and engineering, with few social science participants. 6 percent of graduates study the Arts, while 1/3 of graduates receive a degree in the sciences or engineering, which includes social and behavioral sciences. Twenty percent of 24-year-olds in Germany have a tertiary degree. In the United States, 34 percent of 24-year-olds hold a tertiary degree. Sixteen percent of those with a degree study natural sciences, engineering and technology and 16 percent study behavioral and social sciences. The United States does not have an under-supply of natural science,

engineers and technology degrees because of high skilled immigration from around the world, especially Europe. This accounts for the claims of under-supply but no corollary increasing wage return. The field of study in Britain, the United States, France, and Germany that shows the lowest wage return is the Arts. It also showed the lowest participation of all subjects for men. Arts showed low German female participation, but not as low as science, engineering and technology. Arts in the United States were low as well, but still higher than science, engineering and technology. The concern is not that those studying Arts and Humanities may not make a great deal of money. The concern is that from a market point of view higher educations purpose is to equip economic actors with economically relevant skills, and increasingly governments and corporations are incentivizing, deterring and marketizing the pursuit of knowledge and skills. This influencing is coming with a neoliberal 'best practice' process, for which value is determined only through the price point. The marketization of higher education comes with a framework, which is incapable of understanding that economic value and social value are not necessarily constitutive or complementary.

# Chapter 2
# Neoliberalism, Elements and Policy

## 2.1 Introduction

The increasing market orientation of higher education has strong manifestations in policy for a state lead, coordinated market economy like Germanys and apparent elemental symptoms in a market lead market coordinated economy like the United States. This chapter will ask the question: What are the contemporary neoliberal policies increasing market orientation in the German and American higher educational contexts? We will begin by giving neoliberalism some historical context, define and discuss the basic tenants of neoliberalism as well as map the transition to the contemporary paradigm. The German and American contemporary higher educational contexts will be explored, through elemental transitions in the United States and through policy in Germany. In the United States salient manifestations of a neoliberal influence come in the form of the corprotization of the university into a profit center, the standaridization and ranking systems attempting to make education a comparible commodity, trends in tuition and the side by side changing role of faculty in America, as well as funding alternatives in the US, which comes in the form of student loans. The German case allows for a more direct investigation through policy outgrowth, such as the Bologna Declaration, the Copenhagen Process and the Excellence Initiative. By the end of this chapter, through the aforementioned lines of argument, the market orientation of higher education will be apparent as well as that the German state coordinated system is acting as a proxy for the market.

## 2.2 Prior to the neoliberal paradigm in higher education

Historically, the value of higher education was well recognized, without attempt to identify or quantify the precise benefit, and the value was rarely questioned. Traditionally, societies invested resources in education without expecting any direct economic return (Tilak, 2004; 2). Even in modern societies, however, it was understood that the benefits of education were widespread and that, in the long run, investment by the government in education was recovered by society through increased productivity of the labor force and higher tax receipts. As a result, there was no need for specific measures to directly recover the investments made in education through student fees or market revenue (Talik, 2004; 2). Modern society operated in the same way until the fall of Keynesianism, and the slow rise of neoliberalism. "there is a long and honorable tradition from Adam Smith to Alfred Marshall which assigns to publicly supported education a major role not only in promoting social peace and harmony, and self improvement, but in the process of wealth-creation itself (Vaizey 1962, p. 23)." Universities are seen and claim to be seen as the watchdogs for the free

interchange of ideas in a democratic society; they claim to work to protect freedom of thought, including the freedom to dissent from prevailing orthodoxies. They are quintessentially defined as public interest institutions and their research is granted status and credibility on the basis of its disinterestedness (De La Fuente, 2002; Lieberwitz, 2004 in Lynch 2005; 2).

## 2.3 Neoliberalism: the ethos of the market

When the economic orthodoxy followed John Maynard Keynes, the power of the State was recognized and allocation, planning and other interventions by the State were favored. During the time of Keynesianism, after World War II, Bretton Woods was the International Monetary System, the gold standard was in place, and it was characterized by State provision and financing of education (Talik, 2004; 3). Keynes's advocacy of macroeconomic management did not provide an enduring solution to the problem of maintaining full employment and curbing inflation. When stagnated growth and inflation came in the 1970s, the crisis was significant. Shrinking public budgets led to deep cuts in education, coupled with an increasing population and increasing demand for education. State investment per student plummeted. In the early 1980s, neoliberal economic reform policies were unveiled in several developing countries in the form of stabilization and adjustment reform policies, which were associated with the International Monetary Fund (IMF) and the World Bank (WB) (Richardson and Haralz, 1995). The fall of Keynesianism saw the rise of the market principles within the neoliberal paradigm. Today it is argued that the market, not the government, can meet all of the needs of the people (Talik, 2004; 2). The underlying philosophy of this transition was that any aspect related to the public sector is inefficient and, by contrast, any aspect related to the private sector is efficient and desirable. The argument for the market shows itself as more of an argument against the State, with the market as the default 'other.' The market is seen as an organizing, efficient, non-normative, non-political force which has no political bias. Like many transitions, this one came in the face of crisis. In the 1970s Keynsianism, the economic orthodoxy, was seen to be incapable of solving the debilitating economic shock.

Neoliberalism is a process, and a distinctive way of viewing the world. The distinction between it and what came before it goes to the very heart of what can be said about reality and endogenous rights. The individual is the base unit in conceiving of reality, interaction, liberties, and transactions. Neoliberals see the market as the best way to order transactions within groups of individuals to maximize returns, to develop and to broaden access to the markets. Neoliberalism is characterized, as policy, by the privatization of public services; deregulation; trade and financial liberalization; shrinking the role of the State; and encouraging foreign direct investment (Tilak, 2004; 3).

Neoliberalism, as ideology, developed as the global economic philosophy in line with the Libertarian Ideal à la Hayek and the Austrian school of economics (Tilak, 2004; 3). Hayek believed that there is no such thing as society, only individuals competing and cooperating with one another. Any theories that supposed otherwise were, therefore, to be understood as ideological in general and infested by collectivism (Scott and Marshall, 2005; 260). Hayek's laissez-faire economics stressed that centralized economic planning threatened the very liberties that were then being fought for. Any political programs or social policies to the contrary were to be feared

as foreshadowing impoverishment and totalitarianism. Since he sees States as constraining liberty, Hayek believed in the maximization of individual autonomy and liberty and the minimization of dependency on the State. Individuals are knowledgeable, rational agents whose rule-following acts have unintended consequences at the collective level. Hayek places strong emphasis on rational choice (Scott and Marshall, 2005; 261). The Austiran school counters criticism about restricted freedoms through social norms, religious beliefs, family structures, and market forces by arguing that the individual can, ultimately, by strength of will, shrug off the constraints, but not the coercive power of the States (McLean and McMillan 2009; 310). Neoliberalism views the individual as an economically self-interested subject. The individual is represented as a rational optimizer and the best judge of his/her own interests and needs. In line with free market economics, the best way to allocate resources and opportunities is through the market. The market is both a more efficient mechanism and a morally superior mechanism to the state. According to laissez-faire economic policy, the free market is a self-regulating order, which regulates itself better than the government or any other outside force. Neoliberals show a distinct distrust of governmental power and seek to limit State power within a negative conception, limiting its role to the protection of individual rights (Olssen and Peters, 2005; 314). Under neoliberalism, every social transaction is conceptualized as entrepreneurial, to be carried out purely for personal gain. The market introduces competition as the structuring mechanism through which resources and status are allocated efficiently and fairly. The "invisible hand" of the market is thought to be the most efficient way of sorting out which competing individuals get what resources (Olssen, Codd, and McNeil, 2004; 137).

The vicious circle in which higher education seems to be trapped is that the leaders of higher education institutions feel forced to use more and more market discourse and managerial approaches to restructure their institutions (Tilak, 2004; 5). However, the more they move away from the traditional basic characteristics, legacy and functions of higher education, the more they seem to face formidable legitimacy challenges as public institutions (Maassen and Cloete, 2006; 9).

## 2.4 Policy

Within the context of education the United States is well known for both its liberal market economy and a market coordinated higher education system, while Germany is known for its coordinated market economy and state coordinated higher educational system. The German system provides heavy subsidies in tertiary education, as well as vocational and apprenticeship programs, providing more equitable access to skill allocation than having to utilize the market. The relatively flat hierarchy within the German higher education field implies that they have insulated the field from market pressure, inline with their coordinated mode of production. In this section we will explore the contemporary policies in Germany and manifestations of further marketization in the United States.

### *United States*

The United States has had a market-coordinated system for the contemporary past. In the United States, there are symptoms and trends of further marketization

within higher education institutions. However, as the government plays far less of a direct role, there are few overt policies to report. The federal government has very limited legislative authority over higher education. The impact on higher education has been indirect and diffused through federal financial aid policy, multiple grant making departments, and the influence, without direct power, of the Department of Education (Hursh and Wall 2008; 12). Although the state governments subsidize public in-state education, often they have very little influence on academic university course content or courses of study. This section will explore the ever closer ties between corporations and research universities; the commodification of higher education through standardization, rankings and "charting the future of higher education"; tuition fees and the changing role of faculty; and, lastly, the financing of higher education through student loans.

## Corporatization

In the United States, universities are conceived of less as places that generate knowledge that is important for society in general and more as partners with foundations, government grant-makers and corporations to create knowledge that has an economic benefit (Tilak, 2004; 5). Universities have become corporatized, seeking to minimize their costs while maximizing their revenue (Hursh and Wall 2008; 10). Faculty in the new academic capitalist environment are pressured to develop research that attracts funding, increasingly in the form of corporate sponsorship, and that generates patents that might be utilized by the office of technology transfer to be transformed into profitable lines of business (Hursh and Wall 2008; 10). The commercial hub of nearly every American research university is its technology transfer office. The mission of such an office is to commercialize professors' discoveries, manage patent portfolios and carry out the provisions of the Bayh-Dole Act. The Bayh-Dole Act permits a university, small business, or non-profit institution to elect to pursue ownership of an invention in preference to the government. The Association of University Technology Managers (AUTM) indicates that in the period between 1991 and 2000 the disclosure of new inventions by academic faculty shot up 84 percent, new patent applications rose 238 percent, license agreements rose 161 percent, and royalties increased more than 520 percent (AUTM 2000). In 2000, AUTM reported that business activity associated with sales of products originating from academic research totaled more than $40 billion (AUTM 2000). In 2009, AUTM reported a total sponsored research expenditure of $54 billion and $2.3 billion in total licensing income (AUTM 2000). There are also smaller corporate-sponsored research agreements and consulting deals brokered between individual faculty members and firms, as well as industrial affiliate programs and an increasing number of university and corporate joint research centers (Washburn, 2005; 139). Other programs operate on a membership basis, with corporations agreeing to pay an up-front annual fee in exchange for privileged access to university expertise and resources. For example, at Carnegie Mellon's Magnetic Technology Center, firms such as IBM and Kodak pay an annual fee of $750,000, which permits them to designate three topics each for the center's academic faculty to investigate (Shulman, 2002; 16). At the University of Utah College of Pharmacy, companies pay a basic membership fee in exchange for "early announcements on research progress, first options for licensing technologies, a set number of consulting hours from faculty, and a seat on the board of directors for the affiliates program of study (Tornatzky, Waugaman, Gray, 2002; 138)." Corporate funding for academic research has grown faster than any other source of funding since 1980, rising from $264 million to $2 billion by 2001 (Washburn, 2005; 139).

The overtly pro-business message that is being aggressively promulgated at nearly every research university in the country has encouraged academic corporate collaboration to flourish. North Carolina State, Johns Hopkins, Harvard and numerous other universities now operate their own venture capital funds to bankroll, promote and profit from commercially promising academic research (Desruisseaux, 2000; 152). The University of Chicago created a corporation whose mission is to launch new start-up companies based on faculty inventions. At many of these universities, the focus on profit has become raw and undisguised (Washburn, 2005; 140). As Slaughter and Rhoades (2004) argue, the press toward entrepreneurialism is a push to generate diverse revenue streams for institutions. New knowledge, existing expertise and instructional capacity are all commodities operationalized to generate revenue and institutional profit. The danger in pushing entrepreneurialism in research is the narrowing of academic freedom and the advance of research toward what is fundable and can be published under the funding agreement. The production of knowledge is distorted to conform to the market (Washburn, 2005; 140).

**Standardization and Rankings**

External entities are increasingly calling for accountability and assessment in American higher education (U.S. Dept of Education, 2006). The George W. Bush administration's Department of Education funded a report called "Charting the Future of Higher Education." The Department of Education is increasing the pressure for assessment and quantification in an attempt to satisfy a defined set of higher education outcomes. "Charting the future of higher education" calls for higher education to develop quantitative assessments of student learning outcomes and to quantify educational production in order to allow consumers to compare institutions based on student achievement (U.S. Dept of Education, 2006). In this view, education is a commodity to be measured as a productive function, with the philosophical underpinning of ensuring a well-prepared workforce. Setting a course or standard in American higher education is particularly interesting given the very limited federal legislative authority relating to higher education. An effort to impose a trajectory, at the national level, is unparalleled in the United States. Due to the decentralized nature of higher education in the United States, other actors have developed accountability systems in response to the Department of Education's recommendations. One such system is the Voluntary System of Accountability (2008), a national system of comparison developed by a non-governmental accreditation agency. The system has three components: consumer information; student experiences; and perceptions and student learning outcomes. This comparative system has been called "College Portrait"; consumer information is measured through retention, graduation, employment and a cost calculator. Student experience and perception information is collected through 1 of 4 surveys, which attempt to measure student experience. Student learning outcomes are described as 'well above expected', 'above expected', 'as expected', and 'below expected' (Hursh and Wall 2008; 10). Wall and Keeling (2007) argue that utilizing a limited set of tools that reduce the teaching and learning process to what is being measured cuts away the liberal curriculum, humanities and the liberal arts method. It inappropriately reduces the college experience to what fits into the 'College Portrait'. The assessment process itself distorts university teaching and learning and shifts decision-making away from those in the university, especially faculty, and toward corporate and political leaders. Education has historically participated in developing human capital and contributing to economic growth; however, the transitions with neoliberalism have brought a technical and instrumental view of learning, which fails to connect to well-documented research on learning (Hursh and Wall 2008; 13). Also, there is no counter-argument within such an idiom,

other than an indeterminate value within the supply and demand framework, for an organic and complex process of learning

## Tuition and The Changing Role of Faculty

Between 1980 and 2004, tuition and related charges at public universities increased at 3 times the rate of inflation, increasing over 50 percent since the early 1990s. At private universities and colleges, since the early 1990s, tuition and fees have risen by 36 percent. As of 2010, private tuition is increasing by approximately 3% for four-year universities while public four-year universities' tuition rates are increasing by approximately 5.5 % (Trends in College Pricing, 2010). However, few have noted the paradox of universities simultaneously raising tuition fees and cutting full-time professorships, a process that began in the mid-1970s and is ongoing today (Washburn, 2005; 203). Alexander (2001) argues that the "Increasing reliance, by the institutions, on tuition revenue means that institutions work to maximize tuition revenue by raising tuition, increasing enrollment and lowering costs. The goal of decreasing costs to increase the university's balance sheet results in universities increasingly seeking to hire part-time or non tenure track faculty and cutting back wherever possible." (Alexander, 2001; 306).

High profile professors are recruited to bolster research departments, increase institutional prestige and encourage corporate partnerships to further research funding and patent discovery. Many high profile professors are explicitly promised that their teaching loads would be kept to a bare minimum (Washburn 2005; 200). Meanwhile, the majority of undergraduate instruction falls to graduate students or adjunct faculty who are paid per course taught, do not receive health or social benefits from the university (as they would if they were considered faculty), and are not able to apply for tenure (Washburn 2005; 202). With university fees so high relative to average family income, it would stand to reason that the family and the student consumer expect to access the prestige and intellectual capital of the elite professor. Yet, they only have access to overworked, underpaid adjunct staff. More and more top ranked universities are farming out instruction to adjunct staff. As of 2001, according the U.S. Department of Education, 44.5 percent of all faculties in higher education was employed part-time. The shift toward part-time faculty is a transparent effort to extract more labor from their faculty at a lower per pupil cost (Washburn 2005; 203). There are perceptible negative outgrowths to this policy change. Part-time faculty are less likely to have essay exams due to time constraints, they are more likely to pander to their students as they are evaluated by the students and not their peers, dissatisfaction by the student goes into the teacher's record (Washburn 2005; 204). The rapid growth of part-time faculty is a conscious administrative strategy to lower the cost of instruction and eliminate tenure. This is done implicitly by making new appointments off the tenure track so professors have no opportunity to earn tenure. As of 2005, more than 60 percent of all full-time college and university faculty hold non-tenure track positions. In 1969, only 3.3 percent of all full-time faculty positions were not open to tenure (Washburn 2005; 204). The changing face of university faculty is changing the power of labor within the institutions. Professors are far less able to speak in a unified voice or to exercise effective control over internal academic affairs. Part-time faculty rarely holds seats on academic committees and is shut out of faculty governance. The faculty's power to shape academic policy regarding the establishment, expansion or elimination of departments and programs, the hiring and dismissal of professors, class size, teaching workloads, and the assignment of deanships and other leadership positions are being drastically eroded. At the same

time, the power of administrators to set priorities and push schools in a more commercial direction has increased (Washburn 2005; 207).

Increasingly, university administrators and presidents are coming from the private sector (Washburn 2005; 206). They are recruited for their corporate know-how and not educational experience. More and more, university presidents are chosen on the basis of their ability to raise money and their ties to the corporate sector. Most presidents also sit on the board of directors at large corporations and commonly earn executive-level salaries, which is controversial at a time when tuition fees are skyrocketing and teaching is being slashed. When university presidents sit on company boards, they are compelled to follow the fiduciary responsibility to advance company interests to benefit the shareholders (Washburn 2005; 206). This presents the obvious possibility of a conflict of interest.

## Student Loans[3]

Between 1993 and July 2010, student loans were only available through private financial companies, commonly charging between 7 and 9 percent interest. During this time period, small loans were available through the government, based upon family need as determined through the family income, number of dependents and number of dependents enrolled in higher education (U.S. Department of Education, Free Application for Federal Student Aid). These small government loans would have an interest rate between 4 and 6 percent but the loans were typically no more than $5,000 a year. The federal government also provided need-based grants of up to $5,000 a year. If the average student paid $25,000 dollars a year for 4 years, then after graduation the student would owe approximately $20,000 dollars to the government at approximately 5 percent interest. The student would also owe $80,000 dollars to a financial company at approximately 8 percent interest. Upon graduation, after a 6 month grace period, the student would have a monthly payment of $670 to the financial company and $140 to the government. The student loan industry in the United States is a multi-billion dollar private finance industry. 80,000 dollars paid to the financial company over 20 years at 8 percent interest makes the total amount paid back by the student $151,181.10. The total interest paid is $71,181.10 on the original $80,000 principle. At 6 percent interest, through the government, the total pay-off balance with the same principle is $118,915.11. The total interest paid over the 20 years would be $38,915.11. As of July 2010, the federal government responded to public pressure around profit-making and student debt and got back into directly issuing student loans, as they did prior to 1993. The federal government is, however, only the gatekeeper for the loans. Once the loans are made, they are sold to private finance companies for loan management and servicing. There is a tighter grip on interest rates, however, with 3-5 percent for subsidized loans, and between 6-8 percent for unsubsidized loans.

Companies are making significant profit off of young adults struggling to educate themselves. This generates wealth for the owners of capital but it seems a very high transaction cost for the consumer. The revenue coming from young adults is a

[3] Interest rates and other loan information available @ http://www.direct.ed.gov/calc.html

disproportionate amount relative to the average income of an inexperienced college graduate. Although even young adults save money, at this stage of development it is highly unlikely that even modest portions of an individual's wages would be saved, but rather they would go directly into consumption of material necessities as well as goods and services. This example would seem to counter the arguments of market-cutting transaction costs and increasing efficiency. The government is in an ideal position to aggregate the demand and foster supportive supply to encourage education. The financial distribution of consumption is far preferable, to the economy as a whole, than to funneling revenue directly to the owners of capital.

### *Germany*

In Germany, the relative equality in prestige among academic universities has led German multinational corporations and national champions to recruit from a much larger pool of universities than is common in the United States. Hartmann (2000 in Kupfer 2011) reports that the top 100 executives in Germany came from approximately 22 of 50 universities. Hartmann's study indicates that, in Germany, the mechanisms for the reproduction of opportunity may deal more with individual cultural capital than the prestige of the university, relative to the United States. Hartmann notes that the academic universities have a large majority of students from professional middle classes and that the employees in privileged jobs are pulled from a wide range of academic universities. He concludes that recruitment to elite positions has been on the basis of character (Kupfer 2011; 201). Class background gives the graduate the appropriate skills to enter privileged positions. This literature contrasts with American recruitment practices, where, although class may depend on cultural capital and class background, university prestige is a very salient detail and there is a substantial connection between the university attended and wage returns. Polmann (2009) researched multinational corporate recruitment from elite universities in many countries and reports that in Germany elite universities do not yet exist. Hartmann (2009) conducted a comparative study with the five largest European countries and the three largest non-European economies, and he concluded that traditional national patterns of recruitment still prevail. He also states that, in Germany, foreigners are recruited as professionals but rarely for management positions with domestic multinational corporations or national champions (Kupfer 2011; 201). Hartmann's (2009) and Polmann's (2009) studies suggest that the number of senior positions in Germany is not being narrowed down through a global labor market pursuit of talent.

### Bologna

The Bologna Declaration (1999), signed by 29 nations, lays out a set of measures to increase international competitiveness and enlarge the market share of the European higher education system (Powell and Solga 2008; 2). The declaration created the 'European Higher Education Area' in which participating countries agreed to introduce a two-tiered degree system, a European credit transfer system, student mobility programs, common quality assurance measures, and comparable and internationally readable diplomas and transcripts (European Ministers of Education 1999). 'The European Higher Education Area' was implemented to promote citizen mobility and employability. Implicit to the agenda is the standardization of education within Europe, and to compete with education as a commodity within the global economy (Oosterlynck 2001, in Levidow 2002; 12). The Bologna Process caused the inception of new courses of study. The Bachelor of Arts (BA) and Master of Arts

(MA) degrees were introduced in both academic universities and universities of applied sciences in Germany. This transition was intended to phase out all former course and degrees by 2010. For Germany, this means that all BA recipients now qualify for admission to MA courses. Formerly, this qualification depended on the type of university that conferred the degree (Kupfer 2011; 198). The reform of academic degrees has removed the strict division between the two kinds of higher education tracks, which could be an attempt to place their higher education institutions and programs under a unified and common framework. The second change within the course structure is a graduation hierarchy, e.g. class rank upon graduation, which is used for student comparison for competitive acceptance into MA courses (Kupfer 2011; 198). The 2000 Lisbon Summit demonstrated an EU goal of becoming the "most competitive and dynamic knowledge based society in the world," which was elaborated to mean requiring "the adaptation of education and training to offer tailored learning opportunities to individual citizens at all stages of their lives (Levidow 2005; 157)." Historically, this goal would seem progressive, as it enhances a citizen's capacity to be a social actor, but in recent years it has come to be neoliberal, market oriented policy with a humanistic facade (Levidow 2005; 159).

## The Copenhagen Declaration

The Copenhagen Declaration was signed in 2002 by 31 minesters. It was designed to enhance European cooperation in vocational education and training. It championed goals of a unitary framework of qualifications and competencies, a system of credit transfer, as well as common quality criteria and principles (Powell and Solga 2008; 2). The EU member countries supported a transition towards a knowledge-based economy capable of sustainable economic growth. The declaration indicates that better jobs and greater social cohesion brings new challenges to the development of human resources. As an attempt to implement a Europe wide standard for vocational training and apprenticeship we see the makings of a common education and labor markets. Conflicts over the content and aims of life-long learning, in the Copenhagen Declaration, are a struggle against neoliberalism (Levidow 2005; 160). Through policy documents of the OECD and the European Commission, life-long learning has become an instrument for enhancing national, regional and individual competitiveness. Individual responsibility for learning becomes the duty of the individual to flexibly retool during economic restructuring (Levidow 2005; 159). The Copenhagen Declaration is the vocational and apprenticeship counter part to the Bologna Declaration. Mayer, Muller and Pollack (2007) observe that the dual system in Germany has provided a path for working class students who may otherwise have been diverted from the higher education sector. Working class students in the United States, which has a far less developed vocational education system, have tended to go to lower-ranked universities (Kupfer 2011; 199).

## Excellence Initiative

The 'Excellence Initiative' is central to the effort to promote world-class research, departments and areas of study in Germany. In 2005, the German federal government broke with the traditional equal disbursement of research funding to the academic universities. The initiative was aimed at creating elite universities, a university system hierarchy and generally improving university education and research in the sciences and humanities (Bund, Lander, Vereinbargung 2005; in Kupfer 2011; 202). Between 2006 and 2011, 1.9 billion Euros were allocated for the initiative, three-fourths of it by the state governments and one-fourth by the federal government.

These funds were allocated for three types of programs: graduate schools; 'Clusters of Excellence', which encourage cooperation among at least 25 scientists; and institutional strategies for promoting elite universities. As of 2011, 9 of the 104 academic universities have received 58 percent of the total funding available through all three programs (Kupfer 2011; 203). The distribution is very uneven by subject. The vast majority of Clusters of Excellence and graduate schools' funding is found in engineering and the natural sciences, while the humanities and social sciences are the biggest losers (Hartman 2006; 450 in Kupfer 2011; 203). Although the initiative names the humanities as an area of need, the funding has gone to the market-oriented education, training and research. In 2009, the federal government and the states decided to continue the Excellence Initiative until 2017 and increased the funding by 30%, to a total of 2.7 billion Euros (Kupfer 2011; 203).

> Kupfer notes that *"the distinction caused by unequal research funding and institutional ranking may have economic and cultural effects on equality of opportunity. Institutions may convert advantages in funding and reputation into qualitative advantages by attracting high-achieving students and researchers. Higher tuition fees may bring an additional economic advantage. Studies on the effects of the Excellence Initiative in Germany demonstrate how discourses lead to the social creation of what is called an excellence or academic elite."(*Kupfer 2011; 203).

International economic competition and political priorities have led to this priority around excellence. The increased funding and prestige of the 9 highly funded universities will lead to the construction of a hierarchy among the academic universities (Kupfer 2011; 203). Germany has not seen as massive an expansion of higher education as the United States. Also, there are strong cultural and political views of education in Germany, which may keep the academic universities relatively equal in prestige. Germany's more egalitarian system may resist the tendency to build a prestige hierarchy through the Excellence Initiative (Kupfer 2011; 204). Moreover, since German multinational corporations have been highly successful with their global strategies, there may be no great impetus to change recruitment strategies, which once again undermines the validity of the 'Excellence Initiative' (Kupfer 2011; 200).

Distinct from American educational programs, undergraduates in Germany are not charged tuition fees. However, in 2005 tuition fees were introduced for MA courses. There was lively public debate and a trade union protest. A constitutional court decision left the question of student fees up to the states (Ertl 2005). 6 of the 16 German states currently charge tuition fees. States are also free to design different fee schedules. At the moment, no state charges more than 500 euros for a semester and 1000 euros for the year, for MA pursuit (in Kupfer 2011; 203). Social inclusion was part of the court's reasoning for stipulating that students from lower income background not be deterred from academic pursuit. The constitutional court case also stands in stark contrast to the United Kingdom, where the raising of student fees has not seen the same trend as in Germany. In the United Kingdom in 2010, most universities charged the maximum allowed tuition fee, set by the government, although the comparison is difficult as, for the British universities, price tag also relates to perceived prestige (Kupfer 2011; 201).

## 2.5 Conclusion

The American higher educational system has always been market-led and decentralized. As such, change is not readily apparent at the system level. However, significant change is occurring at the institutional level. This change may be more pervasive than at the system level because it is fragmenting resistance and subtly co-opting the research agenda. The corporatization of institutions has occurred through patents, corporate-funded research and partnerships, as well as venture capital startups. Although Germany has not seen this sort of profiteering or changing motivation at the institutional level, they are making attempts to standardize curricula and degrees under a common framework. This allows the performance of German higher education to be commoditized and will allow the country to compete with other European countries, especially the UK and the United States, to attract international students to its higher education sector. Without standardization under a common framework, there could be no comparison between the systems. The changing institutional structure in the United States is visible in the interplay between skyrocketing tuition fees, part-time adjunct staff teaching a vast majority of undergraduates at research universities, and the rock star-like salaries some high profile professors attract. These factors strip away the power of faculty to resist change at their individual institutions. In Germany, on the other hand, there is systemic change in the form of historically atypical unequal funding, in an attempt to mechanically form a state-coordinated hierarchy of institutions. This is an attempt to mimic the American and English educational systems, motivated by a concern for lagging competiveness in patent licensing, technological research, innovation, and attracting international student talent to benefit their knowledge economy. Though the German system is state-coordinated, the state acts as a proxy for the market. The upside seems to be that faculty power remains intact and the culture dissuades high student fees in the name of equality of access. Also the close relationship and institutional complementarity between labor relations and skill allocation add another layer of defense. In the American market-coordinated system, individuals likely pay large amounts even for low-ranked universities, while in Germany tuition fees have never been politically, culturally or socially acceptable at the undergraduate level. Both countries are stripping value from the humanities via the - new to Germany - exclusive economic paradigm of value. In Germany, none of the 2.7 billion euros allocated to education goes to humanities programs, although the language in the programs speaks to the value of the humanities and arts. In the United States, the individual must weigh the high cost of a university education with the very low wage return of the arts and humanities. Germany's new hierarchy holds no academic value for the humanities. It leads one to wonder if Germany would have a state-coordinated system or a people who have a social, political and cultural belief in educational equity if the humanities had been similarly valued over the last 50 years. In the next chapter the 'Varieties of Capitalism' literature will be used to investigate German policies an their relationship to the mode of production, institutional complementarity and comparative institutional advantage in an attempt to answer the question: Has market incentivization lead the German higher educational system toward convergence with the American higher educational system?

# Chapter 3
# Methodology and Analytical Framework

## 3.1 Methodology

In previous sections, this paper has refuted economistic interpretations of the role and value of higher education. To develop the argument further a theoretical framework is necessary. Analysis of the political, economic and historical underpinnings of differing domestic contemporary modes of production requires a framework, which acknowledges multiple market capitalisms. This author will attempt to apply the Varieties of Capitalism (VoC) approach. The VoC literature beings with Hall and Soskice (2001) but grew out of a Historical Institutionalist tradition. This approach will be used to answer the central question of this paper: Has market incentivization lead the German higher educational system toward convergence with the American higher educational system? Using the fields of institutional complementarity, and skill formation as well as the tools of path dependence and three degrees of change variables as well as the concepts of convergence and divergence of modes of coordination this author will attempt to judge the validity of the hypothesis. The author has hypothesized that there is no convergence of skill formation systems. Following this section will be a detailed description of the Varieties of Capitalism literature, including an elucidation of terms, authors, concepts and critiques, which this author will use in judging the validity of the hypothesis presented. The analysis will be presented in the following order: 1) elements and policy demonstrating convergence; 2) elements and organizational structures demonstrating resistance to convergence; 3) the synthesis, discussing elemental manifestation and structural coordination. I am presenting the information in the order in the hopes of best illuminating the trends of convergence, the structural resistance with in the German coordinated market economy to convergence with a liberal market economy's skill formation sphere, and then make an informed education regarding convergence and divergence with in manifest element and structural coordination. Finally the reflection is to speak more generally and tangencially regarding convergence and divergence within systems exercising different forms of comparative institutional advantage.

To discuss the economistic interpretation of the higher education and labor market nexus, varied policies and trends described within the Germany higher educational sector. I relied on the methodology provided by the VoC analytical framework. The literature indicated a mainly economistic supply and demand-oriented frame of the labor market and higher education nexus. The VoC addresses these particular variables, and the economistic view of coordination and exchange, while still pushing the historical and political frames for value added above the economistic interpretation of skill allocation. VoCs' political economy routes acknowledge and speak to an understanding of

the agent as embedded within a society. There is political and social value in training and skill allocation in addition to labor value.

## 3.2 Varieties of Capitalism (VoC)

Hall and Soskice (2001) indicate that the objective of their framework is to understand the institutional similarities and differences among developed nations (pg1). VoC is an actor-centered approach. Actors may be individuals, firms, producer groups or governments; however, VoC is a firm-centered approach to political economy, which regards companies – 'firms' or 'organizations' - as the crucial actors in a capitalist economy. Firms are the agents of adjustment that react to technological change or international competition. Their actions aggregate into overall levels of economic performance (Hall and Soskice 2001; 6). Hall and Soskice state that the VoC framework is not "settled wisdom or a unified theory of everything, but a work in progress (Hall and Soskice 2001; 2)."

Institutional complementarity is at the center of the VoC analytical framework. There are "5 spheres in which firms must develop relationships to resolve coordination problems central to their core competencies" (Hall and Soskice 2001; 7). These five spheres are: *Industrial relations*, where the coordination of working conditions and wage bargaining occurs, impacting wage and productivity levels at the firm or sectoral level and rates of unemployment or inflation at the level of the economy; *Vocational training and education,* where workers face the problem of deciding which skills to invest in and for how much, the firm faces the problem of securing a workforce with appropriate skills, and outcomes impact companies, workers, the skill levels and competitiveness of the overall economy; *Corporate governance,* where firms secure access to financing and investors seek assurances in returns, and coordination outcomes affect the availability of finance for particular types of projects and the terms which are required for securing funds; *Inter-firm relations,* where companies form relationships with other companies, the priorities are securing demand for products, access to technology and appropriate inputs for production, and outcomes impact the skill levels and competitiveness of the overall economy; and *Employees,* which ensures that employees have the necessary competencies to advance the firm's objective, workers develop 'reservoirs' of specialized firm-specific information that is valuable to the firm (however, workers also have the capacity to withhold information and effort), and the relationships firms develop to overcome these coordination problems condition their own competencies and the nature of an economy's production regimes (Hall and Soskice 2001; 7).

Comparative Institutional Advantage refers to the different ways in which domestic economies resolve coordination problems. Hall and Soskice (2001) distinguish between two "ideal types at the poles of a spectrum along which many nations can be arrayed." (pg 8). The two types of political economies are the Coordinated Market Economies (CMEs) and Liberal Market Economies

(LMEs). LMEs tend to coordinate methods primarily through institutional hierarchies and competitive market arrangements, while CMEs coordinate through strategic relationships outside of the market and rely on state intervention to fix coordination problems.

> Hall and Soskice (2001) submit 'CMEs should be more willing to invest in *specific* and *co-specific* assets - assets whose return depends heavily on active cooperation from others, and which cannot be easily turned to another purpose. While LMEs would likely invest more extensively in *switchable assets* - assets that still have value if diverted from original purpose. CMEs provide greater institutional support for strategic interactions necessary to realize the value of *co-specific* assets - whether industry-specific training, or collaborative research and development. LMEs have more fluid markets and as such provide economic actors with greater opportunity to move their resources around in search of higher returns, encouraging them to acquire switchable assets, such as general skills or multi-purpose technologies (Hall and Soskice 2001; 17).'

The ideal examples for LMEs and CMEs are the United States and Germany, respectively.

Global convergence within political economy is the principle issue raised by globalization for VoC. It indicates a concern for the stability of regulatory regimes and national institutions in the face of heightened competitive pressure. As firms threaten to exit the economy, and move to offshore jobs and operations, governments come under pressure to alter regulations to lower labor costs and taxes and expand internal markets through deregulation. Hall and Soskice (2001) argue that resistance will come from trade unions seeking to protect wages and from social political parties seeking to protect social programs. "The effect on each nation will be determined by the political resistance of labor" (Hall and Soskice 2001; 55). Hall and Soskice (2001) argue that the convergence of economic systems, if apparent, would be an illusion. Streek (2009) in *Re-forming Capitalism* states that VoC argues that '[A] struggle for survival between national economic systems will lead to specialization and diversification, not just of products but also of the institutional regimes under which they are produced' (pg 161). Other theorists argue that competitive market pressures cause institutional change. This economistic best practice, or neoliberal interpretation, argues that social formations adapt to the properties of their most successful competitor in world markets through the process of globalization. In the contemporary period, this means convergence toward a free market economy such as that of the United States and United Kingdom (Streek 2009; 161).

The VoC literature contains a somewhat limited toolbox for evaluating degrees of change. The work of Ebbinghaus (2005), however, provides tools to understand and articulate degrees of change. This author will use Ebbinghaus to make a more nuanced conclusion regarding the convergence or divergence of the German higher education system with the American market-coordinated

higher education system. The system of skill formation is strongly linked with the mode of production in both LMEs and CMEs. Due to institutional complementarities, a convergence within that sphere could be an indicator of a more macro trend of convergence at the level of comparative capitalism. According to Ebbinghaus:

> …[T]hree developmental trajectories of institutional transformation are imaginable: (1) *path stabilization* with no replacement of core principles, but marginal adaptation to environmental change; (2) *path departure* with gradual adaptation through partial renewal of institutional arrangements and limited redirection of core principles; and (3) *path cessation* or switch, in which interventions end institutional self-reinforcement and reproduction, leading ultimately to replacement of existing institutions (Ebbinghaus 2005 in Powell and Solga 2008; 18).

## 3.3 Reflection and Critiques VoC

The above-mentioned indicators used by the VoC cannot talk about everything and, of course, come with bias. The VoC takes a historical institutionalist approach to understanding capitalism. VoC focuses on a structural account emphasizing persistence over time with change constrained by the lock-in effect of path dependence. Historical Institutionalism has a weak positivist tradition, which allows the VoC their empirical roots. The VoC are strong and convincing in explaining continuity, with persistence over time and path dependence. Path dependence is an institutional commitment to a certain historical trajectory, reinforced by all the opportunity costs which have come along with the institutional path. It is easier, and institutionally conditioned to follow a similar trajectory. In order to break such a trajectory there has to be a major occurance or a series of previous smaller occurances, which culminate in an occurance. Historical Institutionalism increased our understanding of capitalism through the analysis of punctuated equilibria and critical junctures, which expanded our insights regarding continuity. However, because the VoC have problems with how agents interpret history, the VoC has problems with contingency. The logic of punctuated equilibria and critical junctures is overtly causal (See Jackson and Deeg 2006). There is relevant critique regarding the role of ideas: ideas are almost seem to be set in stone within institutions, interests seem to be static and ideas after inception.

Hanke, Rhodes and Thatcher (2007) aggregated the following criticism to the VoC 'When discussing change, this literature and its methods fall short of adequately describing the elements that contribute to change. This approach does not go deep enough to analyze the context and social forces, which organize and align through their interests to affect change. The VoC analysis does not look at the individual. Certainly, there are other events that alter the institutional configuration. The VoC's view of economies or institutions could be seen to have

> stopped at one point in time and, therefore, does not account for current changes. Others criticize the 'theoretical route in rational choice, and question the almost exclusive attention to capital at the expense of labor and the state'. Still others have argued that the VoC treats the nation-state as 'hermetically sealed' and neglects the links between the state and the forces of convergence and globalization, thereby neglecting the role of the state. Some have protested that the VoC is apolitical, equilibrium-biased and downplays conflict as well as being sex blind and class blind' (Hanke, Rhodes and Thatcher 2007; 7-8).

In *Beyond Varieties of Capitalism,* Hancke, Rhodes and Thatcher (2007) respond to general and specific criticisms of VoC. The authors clarify and retool the theory, rather than breaking from the main thesis of the approach. Regarding change, the authors state that VoC has a 'strong, non-deterministic understanding of change, given its appreciation that the institutions that underpin coordination are subject to constant renegotiation' (pg.8). They go on to say that their contribution makes VoC 'less vulnerable to charges of determinism, and functionalism (pg9).' The authors 'reveal the VoCs capacity for accommodating and understanding the centrality of conflict (class based and otherwise) in political economies and the reconfiguration of long-standing coalitions, as well as what these coalitional shifts may pose to complementarities and coordination, and lastly the centrality and changing role of the state in all political economies' (pg9). Hancke, Rhodes and Thatcher (2007) argue that the state is 'one element among others of coordination and one that is present everywhere.'(pg15) They go on to say that there is 'too little analytical value-added to be derived from adding a separate variety of capitalism defined exclusively by the role of the state' (pg15). The authors further argue that 'analytical power and parsimony are sacrificed in favor of a greater capacity for detailed description' (pg16).

The approach does not allow for substantive, 'why' question, discussions of power, interest or change, outside of convergence and divergence, which are movements toward or away from another way. However, this analytical framework will not be called on, by this author, to answer questions of interest, change or power but to consider institutional convergence and divergence within national market economies. The VoC has many shortcomings, however, for the thesis of this paper it is particularly, if not uniquely, capable of providing insight.

# Chapter 4 Analysis

## 4.1 Movement toward convergence

Although Germany has a state-coordinated higher education system, there have been several contemporary policies that indicate a trend of market orientation working its way into the training and education sphere of Germany's coordinated market economy. Movement in skill formation is oriented toward meeting industrial labor needs and global competition, which both supports Germany's political economic coordination of markets and supports a thesis of further market impact. The major policies that have been implemented in the last 10 years have also shown symptoms of further market orientation of skill formation. The Excellence Initiative is an attempt to create a hierarchy of elite research universities through historically atypical unequal funding. Germany wishes to compete in global elite technological research, patents, innovation, and the global higher education market. This desire has necessitated further deincentivisation and stripped value from the arts and humanities while championing the natural sciences, engineering and technology pursuits. However, traditionally, Germany has shown less pursuit in these fields than the United States, United Kingdom or France. The Bologna process created a common educational market in Europe. The standardization and measurement criteria are for comparison of regional and global competition within the higher education fields. This comparison requires a unitary framework under which all signatories must operate. This unitary framework is market-oriented and is part of a greater global neoliberal trend within higher education. The undergraduate degree curricula have become more general, although they are still far less general than in the United States. The Master's level degree has become more specifically for professional positions that demand more specific skill sets, which appears to be somewhat of a convergence with the American model. The Copenhagen Process established the same unitary framework for curricula, qualification and competencies for vocational training and apprenticeships as the Bologna Declaration did for academic higher education. The United States has resisted the convergence of vocational skill-oriented training, electing instead on-the-job training or internships. In the United States, vocational training is a secondary school program, which focuses predominantly on disadvantaged youth.

## 4.2 Resistance

Within the policy manifestation of a converging market orientation of Germany's higher education sector there is structural resistance. This resistance demonstrates itself through institutional complementarity. Other spheres within Germany's political economy have a say in the coordination of policy and structural change. There is institutional complementarity between labor relations and skill allocation and, as such, labor has protested the

implementation of tuition fees in Germany. Only 6 of 16 states have implemented fees for Master's programs, due to both labor protests and a historical political and cultural belief in equal access to education. Faculty, labor and state power still remain intact. This same belief has kept the hierarchy of institutions relatively flat. The Government also plays a significant role in coordinating and regulating education policy. There has been much less private involvement at both the system and institutional levels, than the US. The lack of private increasing private influence in the German system supports the institutional complementarity of their CME, and the process of coordination in skill formation that goes through the government, as well as labor relations. This structural difference stands in stark contrast to LMEs like the United States. Bachelor's degrees in Germany are still more skill-specific than the general education model of LMEs, stressing adaptability, transferability and innovation. Germany's system also structurally clashes with a LME model with its bifurcated skill formation system and strong vocational training.

## 4.3 Convergence and Divergence

The aggregate structure, the fields, and state coordination of higher education in Germany remain the same, with a bifurcated higher education structure, with research universities and universities of applied science. Higher education in the United States is still largely differentiated from the German model in its general education, which has remained dominant over specific vocational training and partially defines the market coordinating model and complements the LMEs' adaptability, transferability and innovation. Some characteristics of the LMEs have been selected by the German coordinated market system; however, the main characteristic structure of the coordinated system, which focuses on specialized skills and less on general knowledge, remains the same. The power of the other spheres within their coordinated market system indicates that both institutional complementarity and the state are structures, which slowly change and require collaboration and coordination for that change to occur. The structure of the German coordinated market economy remains the same. The training and education sphere has elements of neoliberal market influence but, structurally, it still relies on a corporatist philosophy of coordination and state control. Perhaps in time these elements will begin to affect the structure, or mechanism, of coordination. However, there is no evidence of such profound systemic change, which would ultimately require a convergence of political economic philosophy toward a liberal market economic model. There is convergence within divergent systems, a *path departure,* is the most appropriate degree of change, with no replacement of core principles, but instead marginal adaptation to environmental changes within the European and global higher education market, research orientation and the knowledge economy.

## 4.4 General Conclusion

The higher education and labor market nexus contained variable that were all self reinforcing. It is part of this exclusive neoliberal logic which perceives economics to a hard science and because of that belief the neoliberal framework is myopic, and only plays within it's own idiom. As the process has gone on over time we see previously not for profit sectors such as education being increasingly targeted for positive revenue streams. The for profit nature of education will inevitably alter it completely. Although the United States still shows a relatively significant portion of the population pursuing degrees in the arts and humanities despite the wage returns. It would seem that even with tuition inceasing drastically and wage returns declining a certain portion of the population is still convicted to study the arts and humanities, how that must baffle some. While Germany affords students tertiary education, the United States has almost twice the percentage of the population with university degrees. A consumer in the United States has access to night classes, weekend classes, access to education through out life without having to leave the labor market, if they can afford it. The pursuit of education in Germany is much more controlled, controlled in content, controlled in funding, but that control of content and control of funding leaves them free from economic pressure forcing them to be profit positive. The system allows for access in the United States but the long run impact of profit orientation in higher education without state control is very concerning. If economic logic were the only way we measured our lives and value, if the profit motive was the only compelling force, it is inevitably short lived. Profit truly only applies to those not compelled to sell their labor to the market, the owners of capital. The education system in the United States is becoming more and more tailored to the labor market, but only for those who must make labor oriented choices when choosing an area of study. Germany was found to be in a state of *path departure*. Despite the recent policies, the German coordinated market economy's institutional complementarity provides more checks and balances against to much change too quickly than a liberal market economy could. Correspondingly the political and social orientation toward equal access to education and , can be seen in labor protests on tuition fees, and strong faculty governance. Their supportive complementary institutions serve to buffer from drastic quick change. The German government has to build coalitions of supportive institutions within their political economy to cause affect. While in the United States the priority is less about stability and more about maximizing return. Elements of the German skill formation system have changed as much as may be necessary for Germany to stay competitive and powerful in the global economy. Conversely if Germany failed to compete and challenge dominance on a global stage, than they may have even less choice. If Germany cannot push back and compete economically, advocating for their coordinated market system, and the corprotist model it grew out of, they could be forced to converge for survival, perhaps it is better to change elements of your own free will than to be forced to change the structure out of economic survival. Time will be the best determining factor as to whether these elements are symptoms of a greater transition or just a manifestation of having to compete within a global marketplace.

# Notes

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# Appendices

| ion/location | All first university degrees | All S&E | Natural sciences[a] | Mathematics/ computer sciences | Agricultural sciences | Social/ behavioral sciences[b] | Engineering | 24-year-olds | First university degrees | NS&E degrees | S beha sc de |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | | | | | | | | Ratio to 24-year-old population[c] | | |
| egions[d] | 7,438,071 | 2,838,044 | 699,110 | 177,387 | 106,601 | 847,920 | 1,007,026 | 74,233,401 | 10.0 | 2.7 | |
| sia[d] | 2,528,607 | 1,176,103 | 275,969 | 23,810 | 42,316 | 356,203 | 477,805 | 46,635,694 | 5.4 | 1.8 | |
| Cambodia[e] | 2,905 | 525 | 106 | 125 | 68 | 148 | 78 | 157,000 | 1.9 | 0.2 | |
| China (2001) | 567,839 | 337,352 | 63,517 | NA | 19,005 | 35,267 | 219,563 | 19,639,000 | 2.9 | 1.5 | |
| Hong Kong (1995) | 11,362 | 5,425 | 2,370 | NA | NA | 1,233 | 1,822 | 104,000 | 10.9 | 4.0 | |
| India (1990) | 750,000 | 176,036 | 147,036 | NA | NA | NA | 29,000 | 17,700,800 | 4.2 | 1.0 | |
| Indonesia (1997) | 144,314 | 97,095 | 10,711 | NA | NA | 65,740 | 20,644 | 4,125,800 | 3.5 | 0.8 | |
| Japan (2001) | 542,314 | 359,019 | 14,192 | 4,965 | 14,084 | 221,300 | 104,478 | 1,719,400 | 31.5 | 8.0 | |
| Kazakstan (1995) | 45,536 | 13,252 | 6,779 | NA | NA | 952 | 5,521 | 290,600 | 15.7 | 4.2 | |
| Laos | 1,762 | 389 | 63 | 30 | 100 | 23 | 173 | 94,000 | 1.9 | 0.4 | |
| Malaysia (1990) | 10,511 | 4,760 | 1,685 | NA | NA | 2,198 | 877 | 406,800 | 2.6 | 0.6 | |
| Singapore (1995) | 5,599 | 5,599 | 2,103 | NA | NA | 1,820 | 1,676 | 49,600 | 11.3 | 7.6 | |
| South Korea | 209,747 | 96,859 | 13,427 | 9,299 | 5,859 | 11,766 | 56,508 | 783,600 | 26.8 | 10.9 | |
| Taiwan (2001) | 117,430 | 48,624 | 3,684 | 9,391 | 3,200 | 5,762 | 26,587 | 385,894 | 30.4 | 11.1 | |
| Thailand (1995) | 119,288 | 31,168 | 10,296 | NA | NA | 9,994 | 10,878 | 1,179,200 | 10.1 | 1.8 | |
| Middle East[d] | 422,908 | 143,092 | 35,889 | 11,987 | 10,435 | 43,496 | 41,285 | 3,874,135 | 10.9 | 2.6 | |
| Egypt[f] (1995) | 85,608 | 13,578 | 6,710 | NA | NA | 1,437 | 5,431 | 1,258,800 | 6.8 | 1.0 | |
| Iran | 69,211 | 33,625 | 6,016 | 3,301 | 4,785 | 9,542 | 9,981 | 1,371,000 | 5.0 | 1.8 | |
| Israel | 30,267 | 14,259 | 945 | 2,054 | 171 | 8,327 | 2,762 | 102,200 | 29.6 | 5.8 | |
| Jordan (1996) | 12,633 | 3,539 | 1,753 | NA | NA | 986 | 800 | 101,800 | 12.4 | 2.5 | |
| Lebanon | 11,990 | 3,030 | 674 | 418 | 28 | 1,433 | 477 | 63,200 | 19.0 | 2.5 | |
| Morocco (short) | 24,680 | 7,972 | 3,020 | 960 | NA | 3,771 | 221 | 590,400 | 4.8 | 0.9 | |
| Morocco (long) | 3,598 | 1,228 | 7 | 151 | 427 | 38 | 605 | NA | NA | NA | |
| Oman | 2,344 | 217 | 51 | 7 | 45 | 0 | 114 | 51,400 | 4.6 | 0.4 | |
| Palestine | 8,807 | 2,615 | 513 | 758 | 66 | 746 | 532 | 55,000 | 16.0 | 3.4 | |
| Qatar | 1,320 | 353 | 138 | 62 | 0 | 85 | 68 | 6,600 | 20.0 | 4.1 | |
| Saudi Arabia (1996) | 26,641 | 5,879 | 4,201 | NA | NA | 828 | 850 | 389,800 | 6.8 | 1.3 | |
| Syria (1995) | 16,600 | 4,530 | 1,398 | NA | NA | NA | 3,132 | 342,600 | 4.8 | 1.3 | |
| Tunisia (1996) | 10,327 | 3,198 | 1,719 | NA | NA | 760 | 719 | 191,200 | 5.4 | 1.3 | |
| Turkey (short) | 118,882 | 49,069 | 8,744 | 4,276 | 4,913 | 15,543 | 15,593 | 1,318,000 | 9.0 | 2.5 | |
| Sub-Saharan Africa[d] | 96,296 | 25,335 | 5,855 | 469 | 3,696 | 10,262 | 5,053 | 1,931,824 | 5.0 | 0.8 | |
| Eritrea | 790 | 360 | 70 | 46 | 74 | 11 | 159 | 67,000 | 1.2 | 0.5 | |
| Ethiopia[f] | 17,579 | 3,664 | 264 | 233 | 1,404 | 536 | 1,227 | 1,152,400 | 1.5 | 0.3 | |
| Ghana | 7,122 | 2,951 | 916 | 0 | 362 | 1,177 | 496 | 376,800 | 1.9 | 0.5 | |
| Kenya[f] | 15,620 | 3,870 | 1,120 | 71 | 1,494 | 445 | 740 | 627,000 | 2.5 | 0.5 | |
| Lesotho | 425 | 177 | 54 | 0 | 16 | 107 | 0 | 36,600 | 1.2 | 0.2 | |
| Madagascar[f] | 3,084 | 1,091 | 270 | 22 | 0 | 599 | 200 | 281,400 | 1.1 | 0.2 | |
| South Africa (1996) | 32,957 | 10,920 | 2,937 | NA | NA | 6,494 | 1,489 | 861,000 | 3.8 | 0.5 | |
| Tanzania | 4,208 | 1,071 | NA | 87 | 299 | 88 | 597 | 650,800 | 0.6 | 0.2 | |
| Uganda | 15,301 | 1,591 | 294 | 56 | 121 | 816 | 304 | 426,200 | 3.6 | 0.2 | |
| Europe[d] | 2,348,771 | 836,456 | 230,506 | 70,003 | 24,568 | 173,240 | 338,139 | 9,844,745 | 23.9 | 6.7 | |
| European Union | 1,330,025 | 477,973 | 112,797 | 60,763 | 16,738 | 107,746 | 179,929 | 4,903,035 | 27.1 | 7.6 | |
| Austria (short) | 1,662 | 744 | 0 | 46 | 0 | 0 | 698 | 92,400 | 16.4 | 4.5 | |
| Austria (long) | 13,470 | 4,434 | 752 | 476 | 236 | 1,057 | 1,913 | NA | NA | NA | |
| Belgium (long) | 22,526 | 8,211 | 1,451 | 519 | 498 | 2,396 | 3,347 | 125,200 | 18.0 | 4.6 | |
| Denmark (1998) | 11,951 | 4,962 | 1,882 | 209 | 171 | 1,925 | 775 | 65,000 | 18.4 | 4.7 | |
| Finland (short) | 13,441 | 4,662 | 37 | 356 | 391 | 198 | 3,680 | 65,600 | 38.5 | 13.2 | |
| Finland (long) | 11,828 | 5,521 | 958 | 490 | 141 | 1,319 | 2,613 | NA | NA | NA | |
| France (short) | 226,314 | 91,030 | 33,511 | 13,910 | 95 | 31,057 | 12,457 | 762,200 | 36.1 | 11.2 | |
| France (long) | 49,002 | 25,130 | 0 | 1,132 | 2,162 | 0 | 21,836 | NA | NA | NA | |
| Germany (short) (2001) | 56,681 | 25,868 | 487 | 1,165 | 960 | 60 | 23,196 | 892,800 | 20.0 | 6.4 | |
| Germany (long) (2001) | 121,937 | 39,295 | 11,029 | 6,139 | 1,180 | 7,824 | 13,123 | NA | NA | NA | |
| Greece (long) | 18,556 | 4,576 | 2,570 | NA | NA | 221 | 1,785 | 155,000 | 12.0 | 2.8 | |
| Iceland (short) | 1,318 | 354 | 72 | 58 | 9 | 122 | 93 | 4,200 | 31.4 | 5.5 | |
| Ireland | 18,669 | 6,636 | 2,231 | 1,405 | 196 | 790 | 2,014 | 69,000 | 27.1 | 8.5 | |
| Italy (short) | 11,568 | 3,729 | 147 | 740 | 102 | 59 | 2,681 | 726,600 | 20.7 | 5.9 | |
| Italy (long) | 139,109 | 53,534 | 8,738 | 4,087 | 1,243 | 14,462 | 25,004 | NA | NA | NA | |
| Netherlands (short) | 66,932 | 17,586 | 2,185 | 1,278 | 1,336 | 5,461 | 7,326 | 187,000 | 37.3 | 6.8 | |
| Netherlands (long) | 2,877 | 607 | 52 | 57 | 75 | 0 | 423 | NA | NA | NA | |
| Portugal (short) | 2,587 | 425 | 70 | NA | NA | 32 | 323 | 160,200 | 16.3 | 2.8 | |
| Portugal (long) | 23,482 | 7,823 | 1,895 | NA | NA | 3,685 | 2,243 | NA | NA | NA | |
| Spain (short) | 87,464 | 23,302 | 0 | 4,606 | 3,236 | 0 | 15,460 | 637,200 | 32.6 | 8.1 | |
| Spain (long) | 120,114 | 42,511 | 10,908 | 4,404 | 1,503 | 13,975 | 11,721 | NA | NA | NA | |
| Sweden (short) | 32,573 | 11,475 | 1,256 | 1,263 | 178 | 1,892 | 6,886 | 102,200 | 33.4 | 9.5 | |
| Sweden (long) | 1,524 | 379 | 0 | 0 | 53 | 278 | 48 | NA | NA | NA | |
| United Kingdom[g] (2001) | 274,440 | 95,180 | 32,570 | 18,420 | 2,970 | 20,930 | 20,280 | 696,600 | 39.4 | 10.7 | |
| European Free Trade Association | 41,449 | 11,005 | 1,286 | 1,110 | 379 | 3,240 | 4,990 | 141,264 | 29.3 | 5.5 | |
| Norway (short) | 17,959 | 3,166 | 32 | 609 | 52 | 1,764 | 709 | 54,400 | 41.2 | 5.2 | |
| Norway (long) | 4,462 | 1,694 | 114 | 164 | 154 | 280 | 982 | NA | NA | NA | |
| Switzerland (short) | 7,648 | 2,488 | 6 | 15 | 84 | 123 | 2,260 | 76,600 | 24.8 | 6.5 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Armenia (long) | 10,206 | 1,343 | NA | NA | 335 | NA | 1,008 | 51,600 | 19.8 | 2.6 |
| Bulgaria | 20,166 | 4,798 | 43 | 409 | 205 | 3,906 | 235 | 122,400 | 16.5 | 0.7 |
| Croatia | 8,847 | 3,003 | 465 | 486 | 309 | 216 | 1,527 | 64,000 | 13.8 | 4.4 |
| Czech Republic (short) | 10,010 | 3,484 | 258 | 489 | 129 | 1,828 | 780 | 174,400 | 14.6 | 4.9 |
| Czech Republic (long) | 15,534 | 7,550 | 821 | 1,660 | 939 | 602 | 3,528 | NA | NA | NA |
| Estonia | 2,272 | 289 | 37 | 21 | 9 | 87 | 135 | 20,000 | 11.4 | 1.0 |
| Georgia | 19,797 | 4,824 | 995 | 170 | 446 | 110 | 3,103 | 79,600 | 24.9 | 5.9 |
| Hungary (short) | 30,320 | 4,320 | 0 | 181 | 1,024 | 0 | 3,115 | 165,200 | 28.4 | 11.9 |
| Hungary (long) | 16,658 | 17,364 | 516 | 369 | 635 | 2,023 | 13,821 | NA | NA | NA |
| Latvia (short) | 9,051 | 2,374 | 235 | 347 | 46 | 1,142 | 604 | 32,600 | 55.7 | 6.4 |
| Latvia (long) | 9,114 | 1,695 | 183 | 217 | 48 | 833 | 414 | NA | NA | NA |
| Lithuania | 11,617 | 3,983 | 313 | 490 | 177 | 530 | 2,473 | 51,800 | 22.4 | 6.7 |
| Macedonia[f] | 3,180 | 943 | 147 | 182 | 94 | 68 | 452 | 37,800 | 8.4 | 2.3 |
| Poland (1996) | 147,536 | 43,304 | 7,544 | NA | NA | 14,142 | 21,618 | 599,490 | 24.6 | 4.9 |
| Romania (short) | 39,013 | 11,899 | 1,249 | 1,014 | 975 | 2,029 | 6,632 | 390,400 | 17.1 | 4.3 |
| Romania (long) | 27,631 | 8,479 | 880 | 740 | 686 | 1,464 | 4,709 | NA | NA | NA |
| Russia (long) (1999) | 554,814 | 216,017 | 101,320 | NA | NA | 32,288 | 82,409 | 2,170,000 | 25.6 | 8.5 |
| Serbia-Montenegrof | 12,545 | 4,477 | 601 | 378 | 579 | 323 | 2,596 | 159,600 | 7.9 | 2.6 |
| Slovak Republic (short) | 5,226 | 851 | 29 | 242 | 29 | 76 | 475 | 82,430 | 24.4 | 6.3 |
| Slovak Republic (long) | 14,903 | 4,630 | 367 | 693 | 736 | 232 | 2,602 | NA | NA | NA |
| Slovenia | 4,507 | 1,415 | 383 | NA | NA | 226 | 806 | 29,000 | 15.5 | 4.1 |
| America[d] | 1,907,776 | 622,870 | 140,020 | 64,961 | 24,274 | 259,393 | 134,222 | 11,628,603 | 16.4 | 3.1 |
| North America | 1,531,958 | 500,391 | 97,532 | 64,569 | 23,268 | 219,134 | 95,888 | 6,491,403 | 23.6 | 4.3 |
| Canada | 116,160 | 53,307 | 10,353 | 5,424 | 1,236 | 26,660 | 9,634 | 397,200 | 29.2 | 6.7 |
| Costa Rica | 4,393 | 1,074 | 104 | 214 | 167 | 264 | 325 | 70,600 | 6.2 | 1.1 |
| Cuba | 16,769 | 3,374 | 1,009 | 219 | 384 | 408 | 1,354 | 201,800 | 8.3 | 1.5 |
| Mexico | 135,233 | 42,049 | 1,701 | 9,589 | 3,237 | 3,338 | 24,184 | 2,038,406 | 6.6 | 1.9 |
| Nicaragua (1997) | 6,282 | 1,965 | 834 | NA | NA | 276 | 855 | 80,397 | 7.8 | 2.1 |
| United States | 1,253,121 | 398,622 | 83,531 | 49,123 | 18,244 | 188,188 | 59,536 | 3,703,000 | 33.8 | 5.7 |
| South America | 375,818 | 122,479 | 42,488 | 392 | 1,006 | 40,259 | 38,334 | 5,137,200 | 7.3 | 1.6 |
| Argentina (1996) | 37,878 | 16,106 | 5,369 | NA | NA | 7,325 | 3,412 | 672,200 | 5.6 | 1.3 |
| Bolivia | 15,341 | 5,115 | 563 | 392 | 1,006 | 997 | 2,157 | 148,000 | 10.4 | 2.8 |
| Brazil (1996) | 245,401 | 78,049 | 32,556 | NA | NA | 27,421 | 18,072 | 3,300,000 | 7.4 | 1.5 |
| Chile (1996) | 23,010 | 10,531 | 2,358 | NA | NA | 4,516 | 3,657 | 239,400 | 9.6 | 2.5 |
| Colombia (1996) | 54,188 | 12,678 | 1,642 | NA | NA | NA | 11,036 | 777,600 | 7.0 | 1.6 |
| Oceania[d] | 133,713 | 34,188 | 10,871 | 6,157 | 1,312 | 5,326 | 10,522 | 318,400 | 42.0 | 9.1 |
| Australia (short) | 106,985 | 28,737 | 8,454 | 5,433 | 1,069 | 4,737 | 9,044 | 269,200 | 41.9 | 9.3 |
| Australia (long) | 5,760 | 1,122 | 69 | 332 | 47 | 181 | 493 | NA | NA | NA |
| New Zealand (short) | 17,177 | 3,529 | 2,292 | 358 | 156 | 408 | 315 | 49,200 | 42.6 | 8.0 |
| New Zealand (long) | 3,791 | 800 | 56 | 34 | 40 | 0 | 670 | NA | NA | NA |

NS&E natural sciences and engineering

[a]Includes physical, biological, earth, atmospheric, and ocean sciences.

[b]Japanese social science data also include business administration.

[c]Number of degrees per 100 24-year-olds. For countries with both short and long degrees, the ratios are calculated with both short and long degrees as the numerator.

[d]Includes only those locations for which relatively recent data are available.

[e]Engineering and agriculture degrees are long, more than 5 years.

[f]Engineering degrees are long.

[g]Includes former colleges and polytechnics. Data for the United Kingdom were revised. Data are now rounded to the nearest 10. Detail may not sum to total because of rounding. Ratios are based on unrounded data.

NOTES: NS&E degrees include natural, agricultural, and computer sciences; mathematics; and engineering. Data for first university degrees use the International Standard Classification of Education (ISCED 97), level 5A. First university degree programs in most countries are less than 5 years. However, in some countries, especially European, some level 5A degree programs are more than 5 years and noted as long. When a country has first university degrees that are less than 5 years and some more than 5 years, such as Germany, the duration is noted as short or long. An unspecified duration means less than 5 years.

SOURCES: Organisation for Economic Co-operation and Development, Center for Education Research and Innovation, *Education at a Glance 2002;* United Nations Educational, Scientific, and Cultural Organization (UNESCO), UNESCO Institute for Statistics database, http://www.unesco.org/statistics; Iberoamerican Network of Science and Technology Indicators (RICYT), *Principales Indicadores de Ciencia y Tecnología* (Buenos Aires, 1999); China—National Research Center for Science and Technology for Development, special tabulations, 2002; India—Department of Science and Technology, *Research and Development Statistics 1996–97* (New Delhi, 1999); Japan—Government of Japan, Ministry of Education, Culture and Science, *Monbusho Survey of Education,* special tabulations (Tokyo, 2003); Taiwan—Ministry of Education, *Educational Statistics of the Republic of China:* 2002 (Taipei, 2002); Germany—Federal Statistical Office, *Prüfungen an Hochschulen 2001* (Wiesbaden, 2002); United Kingdom—Higher Education Statistics Agency special tabulations (Cheltenham, 2003), Russia—Center for Science Research and Statistics, unpublished tabulations (2001); Brazil—Ministry of Education and Culture, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, unpublished tabulations, 2001; Mexico—National Association of Universities and Institutions of Higher Education, *Anuario Estadístico 2001: Población Escolar de Nivel Licenciatura en Universidades e Institutos Tecnológicos,* (Mexico, 2002); and United States—National Science Foundation, Division of Science Resources Statistics, WebCASPAR database system, http://caspar.nsf.gov.