Appendix 1

Data Sources of Intangible Investment

1. Computerized information

(1) Computer Software

The data source of software investment in France is France National Institute of Statistics and Economic Studies (INSEE). INSEE estimates both purchased and own-account software investment. INSEE estimates purchased software investment, using the Supply and Use Tables and annual business surveys on software publishers. This estimate excludes final consumption and subcontracting between companies. INSEE estimates own-account software investment using the labor costs of computer specialists. INSEE get the number of computer specialists from labor surveys, get average gross income from surveys on the compensation of employees, and estimate how much working time those computer specialists spend on developing internal software. Then INSEE uses the structure of production costs of software companies to estimate the non-wage related costs. The sum of labor costs and non-wage costs is the own-account software investment[1].

The data source of software investment in Germany, Italy and Spain is EU KLEMS. EU KLEMS provides the investment and stocks of 8 types of assets—(1) software, (2) computing equipment, (3) communications equipment, (4) transport equipment, (5) other machinery and equipment, (6) total non-resident investment, (7) residential structures, and (8) other assets.

To estimate how much the market sector invested in software, we exclude how much the public sector invested in software[2]. We use the Input-Output Tables (IO Tables) to construct an average ratio of public investment in software. The data source of IO Tables

[1] Source: Emails with Dr. Fabrice Lenglart, Head of the national account department, INSEE.
[2] We define public sector as national and regional governments, the education sector and the health sector.

is EUROSTAT. For example, IO Tables for France are available for 1995, 1997, 1999, 2000 and 2001. We calculate the percentage of investment by the public sector, take a simple average of them and use that simple average for all the years.

(2) Computerized Databases

We measure investment in databases using the revenues of NACE 72.4 (Database Activities). Our data source is the gross output by industry (1991-2004), provided by EU KLEMS. Database activities include the following four activities (The Encyclopedia for Classification Codes, 2007): (1) on-line database publishing, (2) on-line directory and mailing list publishing, (3) other on-line publishing, and (4) web search portals. We argue that companies increase their productivity by accessing data online, so we treat the revenues of Database Activities as companies' investment in databases.

To estimate database investment in the market sector, we exclude database investment in the public sector. The USE tables of EUROSTAT provide the percentages of computer services used by the public sector. For example, in France, public spending on the products of Computer and Related Services (NACE 72) accounts for 2.00% of the total use of those products in 2001. Please see the section of software investment for detailed information.

2. Innovative property

CHS (2005) state that innovative property is the expenditures that lead to a patent, copyright or license, or the acquisition of new resources. CHS (2005) measure six groups of innovative property: (1) R&D in science and engineering, (2) mineral explorations, (3) copyright and license costs, (4) R&D in social science and humanities, (5) development costs in financial industry, and (6) new architectural and engineering designs. We use a slightly different grouping of innovative property. We combine R&D in science and engineering with R&D in social science and humanities.

(1) R&D

Our data source of R&D is EUROSTAT. EUROSTAT provides R&D expenses from 1981 to 2004. The R&D includes R&D in both natural science and social science. We exclude R&D in software industry to avoid double-counting. For example, the software industry of France accounts for 2.18% of total R&D expenses in 2002, 2.40% in 2003, and 2.26% in 2004[3] (EUROSTAT). We take the average of those three percentages (2.28%) and assume that software industry accounts for 2.28% of total R&D expenses in 2004.

To measure how much market sectors invested in R&D, we exclude how much government and higher education sector invested in R&D. EUROSTAT breaks the sectors of R&D performance into four categories—business enterprise sector, government sector, higher education sector, and private non-profit sector. We use Germany as an example. Business sector is the major market sector, accounting for 70% of total R&D expenses in Germany in 2004. Private non-profit sector is a small market sector, accounting for less than 3% of R&D expenses in Germany in 2004.

We should be cautious when we compare R&D expenses across countries. Statistical bureaus of countries interpret the definitions of each item of R&D differently, and use different survey methodologies (EUROSTAT, 2008). Moreover, some R&D is carried out by multi-national companies. Since the reporting unit of R&D is a legal entity, or an establishment, we may include, for example, some R&D located in Germany by France companies as R&D located in France.

(2) Mineral explorations

We can safely ignore how much France, Germany, Italy and Spain spent on mineral exploration. We estimate Germany spent 0.007% of GDP, France spent 0.004% of GDP,

[3] The software industry of France spent 753 million euros (current prices) in R&D in 2002, spent 828 million euros in 2003, and spent 803 million euros in 2004.

Spain spent 0% of GDP and Italy spent 0.02% of GDP even when we use a method that heavily over-estimates exploration costs.

We estimate exploration costs by multiplying exploration costs per barrel with the barrels of crude oil produced in those four countries. We assume that the exploration costs in those four countries equal exploration costs in the North Sea. The costs are $7.5 per barrel (2002 current prices) (Al-Attar and Alomair, 2005). We multiply $7.5 per barrel with the barrels produced in both countries. France, Germany, Spain and Italy respectively produced 10 million barrels, 25 million barrels, 2 million barrels and 40 million barrels of crude oil in 2004 (EUROSTAT). So we estimate Germany spent 0.007% of GDP, France spent 0.004% of GDP, Spain spent 0% of GDP and Italy spent 0.02% of GDP to explore new oil fields.

We heavily over-estimate how much they spent on mineral exploration. We estimate costs in the UK using the same method and reach an estimate 5 times larger than that of MH (2007). We estimate that the UK spent 0.24% of GDP on exploration in 2004, while MH (2007) estimated that the UK spent only 0.04% of GDP, using UK national accounts. So we can ignore how much those four countries spent on mineral exploration.

(3) Copyright and license costs

We follow the method of CHS (2005) to measure copyright and license costs. CHS (2005) proxy copyright and license costs with the development costs of motion pictures and that of radio, television, sound recording and book publishing. CHS (2005) find data on motion pictures, but find no data on radio, television, sound recording and book publishing, so they assume that the development costs in radio, television, sound recording and book publishing industries are double the development costs of motion pictures.

Our data source of the development costs of motion pictures is the Screen Digest (2005). Screen Digest is a London-based research institute on audiovisual media. The Screen Digest provides the production costs for 59 countries from 2000 to 2005. USA invested

$14,716 million in 2004[4] and accounted for 64.8% of the total production costs in the world. The EU 15 invested $2,992 million in 2004. The UK is the biggest movie investor in Europe, investing $1,479 million (£807 million), followed by France ($1,304 million, or €1,048 million) and German ($993 million, or €798 million). The Netherlands invested $85.1 million (€68.4 million). We double the production costs of motion pictures to proxy the developments costs in radio, television, sound recording, and book publishing. So the total copyright and license costs are three times of the development costs of motion pictures.

(4) New Product Development Costs in Financial Industries

We measure development costs, using 20% of the intermediate inputs of financial industry[5]. Our data source is the OECD STAN database for Industrial Analysis. STAN provides the intermediate costs of the financial industry from 1991 to 2003 for Germany, from 1978 to 2003 for France, from 1970 to 2003 for Italy and from 1995 to 2003 for Spain. Financial industry in our data has three sub-industries—financial intermediation (except insurance and pension funding), insurance and pension funding (except compulsory social security) and activities related to financial intermediation. The intermediate inputs include energy, material and services. Most of the intermediate inputs of financial industry are purchased services. In France, 93% of the inputs are purchased services, 1% are energy and 6% are materials. In Germany, 95% of the inputs are purchased services, 1% are energy and 3% are materials (IO Table, EUROSTAT).

Data is unavailable for 2004. We estimate the data for 2004, assuming that the fraction of intermediate inputs to gross output remains the same from 2003 to 2004. For example,

[4] CHS (2005) estimates that the production costs in US were $25 billion per year from 1998 to 2000, while the Screen Digest estimates that the production costs in US were $10 billion in 2000. So we are likely to underestimate the production costs in France and Germany.

[5] CHS (2005) and the UK paper use 20% of the intermediate inputs, and the Netherlands paper use R&D costs. We follow the method of CHS (2005) to be consistent with CHS (2005) and the UK paper. The Netherlands paper argues that development costs in financial industry is already included in their measure of R&D, therefore it excludes development costs in financial sector here. We disagree because development costs may include costs other than R&D costs. Moreover, if we use different measures of development costs and compare them across countries, we will reach wrong conclusions. For example, R&D expenditure in the financial sector of the Netherlands is only 45 million euros in 2003 (Eurostat, 2007), while 20% of the development costs in the financial sector of the Netherlands amount to 4508.8 million euros (Eurostat, 2007).

intermediate inputs account for 50.8% of total output of financial intermediation in France and account for 58.1% of total output in Germany in 2003. Using the EU KLEMS data on gross output, we estimate that Germany, France, Italy and Spain respectively spent 128,808 million euros, 74,719 million euros, 11,001 million euros and 19,333 million euros on intermediate inputs in financial industry in 2004.

A problem is that we may be double-counting some intangible investment. We have already included software investment as an intangible investment, and in the following sections we will include management consulting, market research, architectural and engineering, and advertising, while the intermediate inputs of financial industry include products/services of those industries. To avoid doubling counting those products/services, we exclude intermediate inputs from Computer and Related Services (NACE 72) and Other Business Services (NACE 74). Computer and Related Services include software (NACE 72.2). Other Business Services includes consulting (NACE 74.1), architectural and engineering (NACE 74.2), and advertising (NACE 74.4)[6]. We use the USE Tables of EUROSTAT to calculate the ratio of inputs from NACE 72 and NACE 74 to total inputs. We use France as an example. IO Tables of France are available for 1995, 1997, 1999 and 2001. The ratio of inputs (NACE 72 and NACE 74) to total inputs is 0.37 on average for those four years. We assume that the ratio is 37% for France in all the years.

We assume that 20% of the adjusted intermediate costs equal the costs to develop new products, following CHS (2005).

(5) New Architectural and Engineering Designs

The data source of new architectural and engineering designs is the gross output of Architectural, Engineering and Other Technical Activities (NACE 74.2), provided by EU KLEMS. We measure the investment on new architectural and engineering designs with

[6] We are over-estimating the double-counted intangible investment. We intend to measure inputs from NACE 72.2, NACE 74.1, NACE 74.2 and NACE 74.4, but since the IO Tables are at the 2-digit level, we end up including other industries as well. Those other industries are NACE 72.2-72.6, NACE 74.3, NACE 74.5-74.8.

half of the revenues of those industries. To avoid double-counting some intangible investment, as we did for the financial industry, we exclude the inputs from software, advertising and consulting.

3. Economic competencies

(1) Brand equity

i) Advertisement

Our measure of advertisement is the gross output of advertising industry, provided by EU KLEMS. To estimate advertisement investment, we adjust advertisement spending in two ways. First, we exclude classified advertisement, which is not brand-forming. Following RBT (2007), we assume that classified advertisement equals 50% of the advertisement in newspapers. World Magazine Trends provides the share of advertisement in newspapers from 1994 to 2003. For example, 21% of advertisement is on newspapers in France in 2003, and 41% of advertisement is on newspapers in Germany in 2003. We estimate a time trend of the share of newspaper advertisement and predict the shares for 2004. Second, we assume investment equals 60% of the rest of the spending, following CHS (2005).

ii) Market Research

Our data source of market research (MR) is the turnover of Market Research and and Public Opinion Polling (NACE, K7413), provided by the Structural Business Statistics of Eurostat. The turnover is the estimate of purchased market research. For own-account MR, we follow the assumption in CHS (2005) that own-account market research equals purchased MR.

(2) Firm-specific human capital.

We measure how much firms invested in human capital, using how much firms spent on continuing vocational training[7]. Our major data sources of continuing vocational training are (1) Continuing Vocational Training Survey (CVTS) 2005, (2) Labor Cost Survey (LCS) 2004, provided by EUROSTAT, provided by EUROSTAT, and (3) labor compensations, provided by EU KLEMS. CVTS 2005 provides the direct and indirect costs of continuing vocational training as a percentage of total labor costs in 2005. It includes training courses, training at work places, training through job rotation, self-learning and learning at conferences, lectures and workshops. It excludes training financed by firms with less than 10 employees (European Union, 2000), and excludes three industries—public administration and social security, education and health and social work activities (RBT, 2008). EU KLEMS provides labor compensation, and LCS 2004 provides labor compensation as a percentage of labor costs. Using those two data sets, we calculate labor costs in France and Germany.

Then we break down the continuing training costs into direct costs and indirect costs. Indirect costs are workers' forgone hours. Direct costs are (1) traveling and boarding costs of trainees, (2) costs of training centers, materials and equipments, (3) labor costs of internal trainers, (4) payments to external trainers, (5) levies and grants.

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[7] We suspect that vocational training should also include initial vocational training. Initial vocational training is apprentice training. Excluding apprenticeship from intangible investment does not affect much the estimates of the US, but it biases downward the estimates for Germany. Apprenticeship accounts for 0.3% of employment in the US, and 5% of employment in Germany.

Adding up the costs of apprentice training and continuing vocational training (EUROSTAT), we find that France and Germany invested similar percentages of labor costs in human capital. France invested 2.77% of labor costs, and Germany invested 2.59% of labor costs in firm-specific human capital. The total labor costs are 902,039 million euros in France and 1,145,686 million euros in Germany in 2004. So if we include apprentice costs, we estimate that France and Germany respectively invested 1.51% and 1.34% of GDP (24,986 million euros and 29,673 million euros) in human capital in market sectors in 2004.

(3) Organizational structure

i) Purchased organizational structure.

Investment in organizational structure (OS) includes investment in purchased OS and own-account OS. We measure purchased OS with the revenues of management consulting industry. The data source is the 2004 Annual Survey of the European Management Consultancy Market, provided by the European Federation of Management Consultancies Associations (FEACO). The survey covers five classes of management consultancy—operations management, information technology, corporate strategy services, human resources management and outsourcing services—for eleven private sectors and four public sectors (non-profit and government sector, the European Union, aerospace and defense sector, and healthcare and pharmaceuticals).

To estimate how much the market sector spent on MC, we exclude how much the public sector spent on MC. FEACO provides how much the public sector spent on MC in France from 1999 to 2003, and in the other three countries from 1998 to 2004. Then we estimate the percentage of public spending on MC for missing years.

ii) Own-account Organizational Structure

We measure investment in own-account OS, using 20% of managers' compensation. The data sources are labor compensation, provided by EU KLEMS, and the Structure of Earnings Survey (SES) 2002, provided by EUROSTAT. EU KLEMS provides labor compensation from 1970 to 2004. SES provides the number of employees and the annual earnings by 9 occupations in 2002. The occupation we use for managers is "Legislators, Senior Officials and Managers".

We estimate the earnings of Legislators, Senior Officials and Mangers. The number of legislators, senior officials and managers is 486,006 in Germany in 2002, 909,806 in France, 100,952 in Italy and 157,728 in Spain. The average annual earning of legislators, senior officials and managers is 66,638 euros in Germany, 58,209 euros in France, 85,785

euros in Italy and 55,321 million euros in Spain. The earnings of legislators, senior officials and managers account for 5.74%, 18.26%, 4.6% and 5.5% of the earnings of the whole labor force in Germany, France, Italy and Spain, respectively.

We assume that 20% of managers' compensation equals how much firms spent in own-account organizational structure. So we measure spending in own-account organizational capital with 20% of managers' compensation. Then we measure investment in own-account organizational capital. CHS (2005) assume that 80% of spending in own-account organizational capital is investment.

We under-estimate how much Germany spent on own-account organizational structure, because Germany has a narrower definition of managers than France[8]. In France, "Legislators, Senior Officials and Managers" accounted for 9 % of the labor force, while in Germany, they accounted for only 3% of labor force (SES, 2002)

Moreover, earnings of managers focus on the value of managers, missing other aspects of organizational structure. Using other measures, Germany may have better organizational structure than France. For example, Bloom and van Reenen (2007) survey 715 medium-size manufacturing firms in the U.S, the UK, France and Germany, and find that the US has the best management, followed by Germany, France and the UK. Their results imply that because many French firms practice primogeniture (succession to the oldest son), those French firms have worse management than German firms.

[8] Source: Emails with Ms. Corina Neuerer at the Federal Statistical Office of Germany. She said that Germany does not classify occupations strictly with International Standard Classification of Occupations, and thus Germany had a narrow definition of managers than France.

Appendix 2

Comparison of Estimates of Intangible Spending in the UK and the Netherlands.

Comparing intangible spending across countries is difficult, partly because different scholars use different data sources. For example, in the present study we use many data of trade associations for France and Germany, while MH (2007) and RBT (2008) mostly use national accounts for the UK and the Netherlands respectively. Further, even MH (2007) and RBT (2008) use data at different levels of aggregation from the national accounts. For example, MH (2007) directly measure the turnover of market research using national accounts, while RBT (2008) estimate it from the output of an aggregate industry that includes three other service industries.

In this Appendix, we replicate the results of MH (2007) and RBT (2008) using our data sources, finding out how different data sources may cause different estimates of intangible spending.

We find that different data sources may lead to very different estimates for a variety of reasons. First, indirect measures may differ much from direct measures. For example, for copyright and license costs, RBT (2008) directly measure revenues from royalties and licenses, using Dutch national account, while we indirectly measure copyright and license costs as three times the development costs of motion pictures. As a result, RBT (2008) estimate that the Netherlands spent 0.14% of GDP on copyright and license costs in 2004, while we estimate that the Netherlands spent 0.04% of GDP on copyright and license costs. Second, different surveys provide different estimates. For example, for firm-specific human capital, both RBT (2008) and we use CVTS of EUROSTAT, while MH (2007) use the National Employer Skills Survey of the UK. MH (2007) estimates that the UK spent 2.45% of GDP on firm-specific human capital in 2004, while we estimate that the UK spent only 1.36% of GDP.

One may apply two standards to determine which data source should be preferred. The first standard is that a direct measure may generally be preferred over an indirect measure. For example, for copyright and license costs, we consider RBT (2008)'s measure preferable to ours, because they directly measure revenues from royalties and licenses, while we measure the costs as three times the development costs in the movies industry. The second standard is to compare both measures with a third data source, and let that weigh in deciding which measure to use.

Below we compare the standardized estimate (using the two measurement standards described above) with the original estimates for the UK by MH (2007) and the Netherlands by RBT (2008) for 2004 and our estimates using the same source material as for our estimates for France, Germany, Spain and Italy.

Using the standardized method, we find that the *market* sector of UK spent 10.38% of GDP on intangible assets, 0.50%-point of GDP less than what MH (2007) estimate but 1.24%-point more than our own estimate (Table A1)[9]. In particular, we estimate that the *market* sector of UK spent 1.36% of GDP on computerized information, 3.16% of GDP on innovative property and 5.86% of GDP on economic competencies. In contrast, MH (2007) estimate that the *market* sector of UK spent 1.70% of GDP on computerized information, 3.23% of GDP on innovative property and 5.95% of GDP on economic competencies, whereas our original estimate shows 1.36% of GDP on computerized information, 3.04% of GDP on innovative property and 4.73% of GDP on economic competencies.

Similarly, we estimate that the Netherlands spent 10.50% of GDP on intangible assets in 2004 according to the standardized method, 1.16%-point of GDP more than what RBT (2008) estimate (Table A1). The standardized estimate suggest that the Netherlands spent 1.30% of GDP on computerized information, 3.56% of GDP on innovative property and 5.64% of GDP on economic competencies. In contrast, RBT (2008) estimate that the

[9] In this Appendix, we focus on how much the market sector invests in intangible assets.

Netherlands spent 1.30% of GDP on computerized information, 3.01% of GDP on innovative property and 5.05% of GDP on economic competencies.

The rest of the Appendix compares our estimates, the estimates of MH (2007) and RBT (2008) and the standardized estimates. The results are in Table 1A. There are three columns for each country. Column (1) lists the estimates of the other authors (MH (2007) for the UK, and RBT (2008) for the Netherlands), and Column (2) shows the estimates using our data sources. Column (3) shows the standardized estimate, whereas our original estimate shows 1.30% of GDP on computerized information, 4.53% of GDP on innovative property and 4.48% of GDP on economic competencies.

1. Computerized Information (Software and Databases).

   We do not have a single data source on software investment for the UK, the Netherlands, France and Germany. The data sources of software investment are the national accounts of each country.

   For the UK, our standardized estimate is that the UK invested 1.36% of GDP on software in 2004. We get the standardized estimate by adjusting downward the estimate of MH (2007). The data source of MH (2007) is the Office of National Statistics (ONS), which tends to over-estimate own-account software investment. ONS includes seven occupations in calculating hours spent on software (ONS, 2006)[10]—(1) IT Strategy and Planning Professionals, (2) Software Professionals, (3) Information and Communication Technology Managers, (4) IT Operations Technicians, (5) IT User Support Technicians, (6) Database Assistant/Clerks and (7) Computer Engineers, Installation and Maintenance. In contrast, other OECD countries include only the first two occupations. As a result, ONS estimates a large value of own-account software investment. ONS estimates that the UK invested 1.2% of GDP on own-account software investment, and invested 0.7% of GDP on

[10] Chesson, Adrian and Graeme Chamberlin, Survey-based measures of software investment in the UK, Economic Trends 627, Office for National Statistics, February 2006.

purchased software in 2003, while OECD (2003) estimates that the US invested 0.7% of GDP on own-account software investment, and invested 1.0% of GDP on purchased software in 2003.

We adjust the ONS estimates, assuming that the UK has the same proportion of own-account investment to purchased investment as the US, and assuming that ONS estimates purchased software investment accurately (0.8% of GDP in 2004). We roughly estimate that the UK invested 1.36%[11] of GDP in software in 2003. We use that number for 2004.

For the Netherlands, RBT (2008) measure software investment using the Dutch National Accounts. We use their estimate as the standardized estimate.

2. Innovative Property.

(1) R&D, including natural sciences and social sciences.
Our estimates are close to those of MH (2007) and RBT (2008).

(2) Copyright and license costs.
We estimate smaller values than both MH (2007) and RBT (2008). We follow the indirect method of CHS (2005), and estimate copyright and license costs as three times the development costs of movies. Since MH (2007) and RBT (2008) directly measure this investment, we consider their measures to be preferred for the standardized estimates. MH (2007) use UK National Accounts to directly measure investment in TV and radio, publishing and music industries, and RBT (2008) use national accounts for the Netherlands to directly measure revenues from royalties and licenses.

[11] 1.36%=0.8%+0.8%*0.7.

(3) Development costs in financial industry.

We estimate a value similar to MH (2007) for the UK, but estimate a value much larger than RBT (2008) for the Netherlands. We follow the method of CHS (2005), and measure development costs in financial industry as 20% of intermediate costs, while RBT (2008) argue that the development costs in the financial industry equals R&D in financial industry, which they argue to be already included in their measure of R&D and therefore is excluded here. However, development costs may include costs other than R&D costs. Moreover, if we use different measures of development costs and compare them across countries, we will reach wrong conclusions. For example, R&D expenditure in the financial sector of the Netherlands is only 45 million euros in 2003 (Eurostat, 2007), while 20% of the development costs in the financial sector of the Netherlands amount to 4,509 million euros (Eurostat, 2007).

(4) New architectural and engineering designs.

Our estimate of the UK is smaller than MH (2007), and our estimate of the Netherlands is larger than RBT (2008). We use 50% of the gross output of SIC 742 to measure investment in new architectural and engineering designs. Our data source is EU KLEMS. EU KLEMS estimates the gross output of 3-digit industries, using the output of 2-digit industries and Input-Output tables. Our estimate is preferred for the standardized method relative to than MH's, but for the Netherlands we used RBT's measure as standardized estimate.

As to the UK, our data source (EU KLEMS) provides that the gross output of SIC 742 is 42,447 million euros (28,807 million pounds, current prices) in 2004, while MH (2007) provides that the turnover (sales) of SIC 742 is 44,000 million euros[12]. We use a third data source to determine which measure is closest. The Structural Business Survey (SBS) of the EUROSTAT provides that the turnover is 33937 million euros, closer to our measure and smaller than MH's measure. As to the

[12]It is 30 billion pounds in MH (2007).

Netherlands, RBT (2008) directly measure investment in new architectural and engineering designs, using the National Accounts for the Netherlands, while we indirectly measure it as 50% of the gross output. So we consider their measure for the standardized estimate.

3. Economic Competencies.

(1) Advertising expenditure.

We estimate smaller values than both the MH (2007) and RBT (2008). As to the UK, the MH's estimate is used as the standardized estimate. The data source of MH (2007) is the surveys of Advertising Association of the UK, providing that the UK spent 18 billion pounds (26,523 million euros, current prices) on advertisement in 2004. Our data source is EU KLEMS, estimating the gross output of advertising industry is 22,571 million euros (15,318 million pounds). We also used a third data source to cross-check the two estimates. The Structural Business Survey (SBS) estimates that the turnover of advertisement is 26,344 million euros, closer to the MH number and larger than our number.

As to the Netherlands, our data source (EU KLEMS) estimates that the gross output of advertising industry is 4,948 million euros (current prices), RBT's data source (Dutch National Accounts) estimates that the Netherlands spent 13,500 million euros on advertisement every year from 2001 to 2004, and the SBS of the EUROSTAT estimates that the turnover of advertisement is 6,629 million euros in 2004. RBT argue there are strong reasons to increase the turnover estimate because firms outside the advertising industry also account for a significant share of advertising. For international comparability, we chose the turnover estimates as the standard for comparison.

(2) Market research.

Our estimate of the UK is close to that of MH (2007), but our estimate of the Netherlands is twice as that of RBT (2008). As we directly measure the turnover of "market research and public polling" using the SBS of EUROSTAT, we use that measure for our standardized estimate. In contrast, RBT (2008) use no direct measure of market research. They use the Dutch national accounts, which provide the total spending on market research, organizational consultancy, public relation agencies and other economic research and consultancy. Then they estimate the spending on market research from that aggregate data. Since our measure is direct we prefer it for our standardized measure.

(3) Training costs.

Our estimate is much smaller than MH (2007), because our data source (CVTS) excludes initial startup training and on-the-job training (MH, 2007)[13]. MH (2007) compare CVTS with their data source, NESS05, and conclude that CVTS under-estimates training costs. NESS05 estimates that the training costs are 33.3 billion pounds in the UK in 2005, while CVTS estimates only 18.5 billion pounds in 2004 (Table 1A).

Our estimate is close to RBT (2008), because RBT (2008) also uses CVTS. We estimate that the Netherlands spent 1.45% of GDP on training in 2004. Because of the problem mentioned above, we adjust the estimate upward, using the percentage of training costs that CVTS covers in the UK. Our standardized estimate is that the Netherlands invested 2.61% of GDP[14] in training in 2004.

(4) Purchased organizational structure.

Our estimate of the UK is close to MH (2007), but our estimate of the Netherlands is much smaller than RBT (2008). We use our estimate for the Netherlands, because we directly measure management consulting using the Annual Survey on Management Consultancy, while RBT (2008) uses no direct measure. They

[13] We use both CVTS and apprentice costs for France and Germany. We exclude apprentice costs for the UK and the Netherlands, because EUROSTAT provides no apprentice costs for the Netherlands.
[14] 2.61%=1.45%*(33.3/18.5).

estimate spending on organizational consultancy using the same method as they estimate market research.

(5) Own-account organizational structure.

Our estimate of the UK is larger than MH (2007). We use the Structure of Earnings Survey (SES), provided by EUROSTAT, while MH (2007) use the Annual Survey of Hours and Earnings, provided by the UK statistical office. We suspect that the SES inaccurately measures the number of managers[15], so MH (2007)'s estimate is preferred for the standardized measure. RBT (2008) do not estimate own-account organizational structure.

Our standardized estimate for the UK shows that MH (2007) over-estimate intangible spending by 0.50%-point of GDP, mostly because they over-estimate spending on software and architectural and engineering designs. Our standardized estimate of the Netherlands shows that RBT (2008) under-estimate intangible spending by 1.16%-point of GDP, mostly because they find lower development costs in financial industry, advertising expenditure, firm-specific human capital and own-account organizational structure.

[15] For more information, please see the main text on own-account organizational structure.

Table A1: Intangible Spending in the UK and the Netherlands (2004, % of GDP)[1]

	UK[2]			Netherlands[3]		
Type of Expenditure	(1) MH (2007)	(2) Our estimation	(3) Our standardised estimation	(1) RBT (2008)[4]	(2) Our estimation	(3) Our standardised estimation
1. Computerized information	**1.70**	**1.36**	**1.36**	**1.30**	**1.30**	**1.30**
2. Innovative property	**3.23**	**3.04**	**3.16**	**3.01**	**4.35**	**3.56**
a) R&D, including social sciences and humanities	1.09	1.04	1.04	1.89	1.77	1.89
b) Mineral exploration and evaluation	0.04	--	0.04	0.04	--	0.04
c) Copyright and license costs	0.21	0.14	0.21	0.14	0.04	0.14
d) Development costs in financial industry	0.69	0.67	0.67	0.02	0.57	0.57
e) New architectural and engineering designs	1.20	1.20	1.20	0.92	1.97	0.92
3. Economic competencies	**5.95**	**4.73**	**5.86**	**5.05**	**4.48**	**5.64**
a) Brand equity	1.59	1.08	1.58	2.65	1.31	1.31
Advertising expenditure	1.20	0.70	1.20	2.38	0.81	0.81
Market research	0.39	0.38	0.38	0.24	0.50	0.50
b) Firm-specific human capital[5]	2.45	1.36	2.45	1.16	1.45[5]	2.61
Direct firm expenses	1.27	1.06	1.27	0.69	0.88	1.58
Wage and salary costs of employee time	1.17	0.30	1.17	0.47	0.57	1.03
c) Organizational structure	1.92	2.29	1.83	1.24	1.72	1.72
Purchased	0.60	0.52	0.52	1.24	0.41	0.41
Own account	1.31	1.77	1.31	-	1.31	1.31
Total Spending	**10.88**	**9.14**	**10.38**	**9.34**	**10.13**	**10.50**

Note: 1. Column (1) lists the estimates of the other authors (MH (2007) for the UK, and RBT (2008) for the Netherlands), and Column (2) shows the estimates using our data sources. Then we choose the better estimates between Column (1) and Column (2), and use it as our best estimate in Column (3).
2. Spending by the market sector.
3. Spending by the market sector and the public sector.
4. RBT (2008) measures investment in billion euros in Table 2. We use that table to calculate investment as a percentage of GDP. Numbers may not add up because of rounding.
5. We exclude apprentice training to make the UK and the Netherlands consistent, because we have data on apprentice training for the UK, but not for the Netherlands.