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van Lieshout, H.A.M.

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Firms, Human Capital and Productivity: Matched Establishment Comparisons

Harm van Lieshout

(Scholar, Universiteit van Amsterdam)
1. **Education and economic performance**

Education and training are considered of increasing importance for the competitiveness of firms, economic sectors and nations. With shrinking trade barriers and increasing international competition, the qualifications of the workforce are one of fewer remaining instruments to enhance competitiveness. Finegold et al. (1994), for instance, show work organisation and (low) skill levels to be factors that played a role in the decline of the competitive position of the once superior American machine tool industry over the eighties. Even while this industry itself had come up with the most important technological innovation in the sector (computer-numerically-controlled machines), Japanese and German firms came up with more successful productive strategies in using such machines.

Competition is pretty global in the machine tool industry, and the technology is worldwide available. That firms from different countries nevertheless use quite distinct productive strategies shows that work organisation is dictated by technology. Technology leaves (substantial) room for choices in work organisation, and these choices may in fact be decisive for a firm’s economic performance. Similar machinery hosts a quite different work organisation in different firms, which in turn may lead to a quite different structure of a firm’s labour demand (in terms of workers’ qualifications). National characteristics, i.e. education and training institutions, may influence firms’ choices in these respects. But, as national institutions do not dictate work organisation any more than does technology, there will also be substantial variation across firms within a country. In particular, we see important differences in the role and operation of internal labour markets within firms. Various types of rules such as wage systems, job classifications, and rules regarding employment security tend to fit together in a more or less coherent system, representing the overall human resource management strategy of a firm (Osterman, 1994). Again, to some extent national characteristics seem involved. German firms, for example, have stronger job security, stronger employee voice through workforce councils, lower ratios of supervisors to front-line employees, and more emphasis on formal skills-based training than their American counterparts. This way, firms and their strategic choices are a crucial intermediary variable between qualifications and economic performance.

When we look for variables to measure the effect of skills and work organisation on economic performance, labour productivity is the first that springs to mind. Traditionally, world
economic leaders have also been word leaders in labour productivity, such as the US this
century and the UK before that. National productivity levels are converging between countries
(Bernard & Jones, 1996; CPB, 1998). But aggregate convergence may mask substantial
differences at the sectoral levels, and it seems to be primarily driven by service industries
while manufacturing industries show little or no convergence (Bernard & Jones, 1996). The
Netherlands has consistently ranked amongst the two or three countries with the highest level
of GDP per hour worked over the last decades (CPB, 1998). But average annual growth in
labor productivity per hour worked has gradually declined, and has led to relative decline of
Dutch GDP per hour of the Netherlands compared to North-Western Europe and the EU 15.
The Netherlands is especially productive in manufacturing relative to other countries, but lags
behind in services.

But the importance of human capital may go beyond direct consequences for labour
productivity. Paauwe & Williams (1998: 67) attribute the increased importance of human
capital to the changing nature of economic competition. No longer are current products,
services and markets are central for acquiring a lasting competitive edge, but core
competencies (Prahalad & Hamel, 1990) and capabilities (Bartlett & Goshall, 1989), which
can guarantee a continuous flow of new products and services in the future. Examples are
Sony’s ability to miniaturize, NIKE’s promotional ability based on sport stars, and Black &
Decker’s continuous development of new commercial applications of a small reliable
electronic engine.

In sum, firms and their work organisation are the traffic officers at the crossroads between
skills and economic performance, and it is precisely this role that currently attracts great
interest from researchers and policy-makers alike. In the Netherlands, for example, the OSA
program 1996-1999 gives ample attention to changing employment structures as a result of
globalisation. Because of the uncertain nature of the relations between technology,
organisation and globalisation, OSA first hosted an exploratory review of relevant literature
(Alders, 1998). While this resulted in an interesting review of various studies, some studies
that are highly relevant and methodologically interesting are notoriously lacking in it.
This paper simply aims to fill the gap. It explores a number of interesting lines of research on
the relations between training/skills, work organisation and economic performance. Section
two discusses the development of so-called matched establishment comparisons. Matched
establishment comparisons (MECs) focus on one, narrowly defined, industry in two or more countries. Within each country, a sample of production (or service) establishments is selected within the industry, whereby the establishments are matched as much as possible along vital dimensions such as their employment size and the type of products/services offered. Each of the establishments is visited in order to establish the qualifications of the workforce and the organisation, and to measure the physical labour productivity achieved. This is achieved through a combination of semi-structured interviews, a questionnaire, and direct observations of the production (service) process. Section three discusses some other examples of international comparative research on firms within a particular industry, that focus on similar topics but have different strengths (and weaknesses) than the MEC method. The final section offers a (benevolent) critique on the MEC method, and outlines challenging questions for which it would be interesting to use such an (possibly slightly adapted) MEC method for from a Dutch perspective.

2 Matched establishment comparisons

2.1 The National Institute of Economic and Social Research

The (British) National Institute of Economic and Social Research (NIESR) has a continuing research program to measure and explain differences in output per head between Britain and other industrial countries, and explore their relation to training and education. Its object is to “…estimate differences in manufacturing productivity between Britain and other industrial countries, measure differences in their workforce skills, elucidate the essential differences in their systems of education and training, and, finally, to see what the UK might learn from the way things were done abroad.” (Prais, 1995a: i). The program started out in the early eighties, inspired by the waning economic performance of Britain. Once the basis of the Industrial Revolution and the world leader of productivity and welfare, Britain had been subject to a slow but persistent process of catch-up by others. The U.S was the first country to overtake Britain in both aspects, by the end of the 19th century. By the 1930s, Germany had achieved an approximately similar labour productivity in industry. And by the 1980s, it had become evident that the main continental European countries had overtaken Britain in industrial productivity as a whole, and in their living standards (Prais, 1994: 154-155).
The first individual projects within this research program compared the qualifications of the labour force as a whole, and training standards for various occupations, between Germany and Britain, with unfavourable results for Britain (Prais, 1981; Prais & Wagner, 1983). As a next step, in order to trace the effects of more training on productivity in realistic detail, a series of Anglo-German comparisons at the level of individual plants was undertaken in four industries. It is these and subsequent matched establishment comparisons (MECs) that concern us here. Before turning to them in more detail, however, it should be pointed out that these MECs have continuously been combined with other lines of research, in order to establish the British relative position in workforce skills and labour productivity, and to give the program its broad impact. For instance, parallel to the first series of MECs, the Institute extended its comparisons of vocational qualifications and training standards for various occupations to, first, a second country (France; i.e. Prais & Steedman, 1986) and, second, more countries (Prais, 1988). Simultaneously, it compared British pupils’ school-leaving attainments, particularly in mathematics, with those in Germany (Prais & Wagner, 1986) and Japan (Prais, 1987). In addition, the Institute engages in international statistical economic productivity comparisons (i.e. O’Mahoney, 1992; Oulton, 1993; O’Mahoney et al., 1996). The program continues to do research on these topics, and has found them at the centre of British public policy debates since the late eighties.

2.2 The first series of MECs: four Anglo-German comparisons

The first series of MECs exclusively concerned Britain and Germany, and consisted of four separate studies. The first study focused on the metalworking trades (Daly et al., 1985). Its central object was to cast light on how present-day productivity is affected by differences in the type of machinery used and by differences in the skills and qualifications of the workforce on the factory floor. The researchers visited 16 mainly small and medium size (between 50 and 500 workers) metalworking plants in each country, producing relatively simple products: screws and nuts, small coil and leaf springs, cutting drills, hydraulic valves, and motor parts. Choosing simple products makes it easier to understand the efficiency factors at work on the factory floor than would be the case with complex products as internal combustion engines. In addition, it eliminates the problem of variations in product quality between plants, and makes
it easier to measure productivity in physical terms. Besides these 32 plants, they also visited 13 suppliers of machine tools. The matching occurs in several rounds, to matching as close as possible. Approximately half of the firms approached who were in comparable trades agreed to participate. In the end, six pairs of plants were found sufficiently similar to warrant a comparison of labour productivity. The calculations were based on actual (not standard) outputs of machines per unit of time (including downtime). Depending upon how the production process was laid out and on how records were kept, the researchers sometimes only took an important single part of the production sequence, sometimes a series of operations, and sometimes the total number of completed products. The sizes of the batches were broadly similar in both countries. But in all six firms the German firms showed a higher labour productivity varying from a mere 10 percent to as much as 130 percent. The average differential was 63%. While the researchers were prepared to find only a small part of the total productivity differential between both countries to be evident at this shop-floor level (especially when looking at relatively simple products), the figures they found in fact corresponded to figures derived from national Censuses of Production. In addition to the higher quantitative productivity of the direct German labour inputs, the researchers also discerned a tendency for the German products to be technically more advanced and of a higher quality. In explaining these differences, the researchers found workforce skills to be more important (at all levels) than machinery. About half of the German workers on the shopfloor had an apprenticeship-type qualification, as compared to a quarter in Britain. British machinery was not older than that found in German plants, but it more often lacked ancillary feeding devices, proper maintenance and advanced numerical control devices; and breakdowns were more frequent. The faults for poor maintenance, poor production control, and poor diagnosis of faults has its origins in the technical skills of foreman and operators. Where British firms were using less advanced machinery, or were installing more advanced machinery with undue delay, the problem usually lay in a lack of technically qualified management. In sum, skill at both supervisory and shopfloor levels were found to contribute to a better choice and utilisation of machinery, and higher productivity in Germany.

A second study compared a part of woods furniture industry in both countries: the production of fitted kitchens (Steedman & Wagner, 1987). They reason to chose this industry is that, while it relies on skilled workmanship and skilled design, it does not so obviously require the high degree of precision and technical complexity involved in metalworking. As no country
can be good at everything, and Germany just may have inherited a comparative advantage in precision engineering. So the underlying question was whether the German insistence on formal apprenticeship training of all workers also works to the advantage of Germany with a simpler manufacturing process. Visits were made to nine British and eight German manufacturers, selected to span the middle range of firms. The firms were selected on the basis of their total employment and their product range. Approximately two thirds of all firms originally contacted agreed to a visit, and about half of them were actually visited. In addition, interviews were held with six suppliers of machinery, and with twelve experts from trade associations, trade journals and research and educational institutions connected with the industry. Within the industry, there is an important difference in the quality of fitted kitchens. The products of the typical German manufacture differed in three ways from its British counterpart. The German manufacturer almost exclusively concentrates on the higher quality end of the market. Even the top range of British producers did not match their German counterparts in quality or variety of colour and finish. And the larger German manufacturers (contrary to their British counterparts) were so organised as to be able to make individualised pieces to customers’ precise dimensions and specifications. Output per employee was known to be about 66% higher in Germany based on national censuses of production. To try to understand this gap, the researchers focused on a central stage in the production process for further examination: the four main operations involved in making the basic panels for the carcase of a kitchen cabinet. They found average output per line and per shift of machined panels not to be significantly different between the two countries, with an average gap of only 6% in favour of Germany. The important difference was in manning levels, which were just over twice as high in Britain as in Germany. Consequently, output per employee on these processes taken together was about 2.3 times higher in Germany. The Germans seemed to have better exploited the potential for economies of scales in this particular part of the industry, while simultaneously producing a more varied product. Again, machinery in Britain was often as new as in Germany, but not as technologically advanced. Fears of maintenance problems and breakdowns inhibited British manufacturers from linking together successive machines. In addition, German firms had a more systematic approach to the timing of the production of components and machine loading. 90% of German workers had vocational qualifications as compared to a mere 10% in Britain. These provided the seed-bed for introducing advanced machinery and advanced production methods, putting them into smooth operation, and fully exploiting their potential. So even with simpler products than in precision
engineering, there are advantages to high levels of skill to take advantage of new production technology.

The third concerned clothing manufacture, which was chosen for similar reasons as the woods furniture industry: do the broadly similar conclusions from the previous two studies hold for yet ‘simpler’ industries (Steedman & Wagner, 1989). Clothing seemed an appropriate industry for this purpose, as the basic sewing machine is cheap, has only shown modest technological advantages, and basic operations can rapidly be mastered even by schoolleavers. Within the industry, the researchers confined themselves to the production of women’s outerwear, and, as far as possible, on plants producing skirts, jackets, suits and blouses. In this study, only one third of the firms contacted allowed visits; the researchers attribute this difference with the previous studies to the shorter planning horizons of the firms in this industry, as compared to those in the previous two. The researchers visited 12 British and 10 German plants for the actual comparison. In addition, some 20 interviews were held with representatives of machinery suppliers, training institutions, unions, trade associations, buyers, and leading retailers. And some small clothing workshops were visited in Britain. German manufacturers were found to rely on producing small batches of high quality goods in great variety; British firms to a very great extent on manufacturing very long runs of standard items. The typical length of a production run was 150-300 garments in Germany, and hundred-fold greater in the majority of British plants. As in woods furniture, German products were typically more stylish and of higher quality: they often consisted of more separate pieces, were made of a checked or patterned material, and had more decorative stitching and other detail. The number of garments produced per worker per day to as much as 14. On average, very little difference was apparent, with British firms producing just under, and the German just over 5. But the German plants thus incorporated a higher quality in work-content in the same number of garments a day. And when comparing average output per employee in a sub-sample of plants producing more closely comparable garments in similar batch sizes, German plants produced roughly twice as many garments per employee. Despite the fact that machining is the most labour-intensive part of the process and there are limits beyond which machining speeds cannot be increased, the average machinist output was 40% greater in the German sub-sample, though variability was too great for this difference to significant beyond the 10%-level. German machines were on average younger than British ones. But it seemed that it was no so much these newer machines, as their
specialised adaptation in Germany, presumably due to the greater involvement of plant maintenance mechanics and technicians in production planning. Over 80% of German machinists had completed two- to three-year vocational training courses, while there was not a single machinist that qualified in the British sample. This was evidently a major reason for the German productivity advantage: German trained machinists reached full productivity more rapidly, required less fault-finders, and less unpicking of bad work. There were similar differences at higher levels of qualifications.

The fourth and final study of this series presented a first attempt to examine a branch of the services sector: hotel-keeping (Prais et al., 1989). The first goal was to establish whether there actually are international productivity differences in such a service industry similar to those previously observed in manufacturing. And, as this turned out to be the case, the second goal was to see whether education and training in apparently simple and straightforward activities involved in hotel-keeping (reception and housekeeping) contribute to higher productivity. This question is particularly relevant, as various observers on the German apprenticeship system have conceded that this has advantages in manufacturing and construction, but doubt whether it is suited or necessary for (simple) service industries. The researchers concentrated on the central range of hotel sizes (10-100 rooms), and to hotels in large towns. A third of British hotels and half of German hotels contacted agreed to a visit, and subsequently 14 British and 24 German hotels were visited. At each hotel the researchers conducted a number of interviews, usually with the acting manager and often with a receptionist and a housekeeper. In addition, the researchers visited four vocational colleges and had phone interviews with a dozen more; and held discussions with industry-wide bodies and unions in both countries. The samples were not only matched for hotel size, but also for quality. The researchers had to ensure that German and British hotels didn’t offer substantially different standards of service, and that differences in their restaurant sides were not of different average importance in both countries. They controlled for quality by following the grading of the Michelin guide (and limited the sample to two medium quality grades thereof) and eliminated employees involved in the provision of all meals except breakfast. Average labour requirements were about 50% higher per guest-night in London, and about twice as great in large English provincial towns than in Germany. The finding is thus that the productivity difference in this service industry is not lower but (if anything) slightly higher than in manufacturing as a whole. The main difference again stems from qualified manpower. In the
German sample, 35% of all workers had craft-level qualifications, as compared to 14% in the British sample. Almost all German workers in management, reception and at the supervisory level in housekeeping had such qualifications. In Britain, it was less usual in management, rare in reception, and hardly ever apparent in housekeeping supervision. And the greater breadth and practical content of German vocational qualifications in this area as compared to British proved to be better suited for the middle range of hotels, where flexibility is an essential part of the daily work for all personnel. Chambermaids in both countries were unqualified. But thanks to better work organisation by their (in the German case vocationally qualified) supervisors, their productivity was higher in Germany. Differences in total spending on capital equipment were of less importance. The most important ones found were more appropriate computer packages in reception areas, the greater use of chambermaids’ trolleys, and a better choice of labour-saving fixtures and fittings. These reflected the greater practical element in managerial training in Germany.

2.3 Improving the method and expanding the scope

The interesting findings of this first series of MECs triggered more to come. Having established the inferior British performance relative to Germany in four different industries, one logical step was to expand the method to encompass other countries. The first of these was the Netherlands; two Anglo-Dutch MECs were carried out, one in engineering, the other in food-processing (Mason et al., 1992, Mason & van Ark, 1996). This engineering comparison was later extended to include the US (Mason & Finegold, 1995), while the food processing comparison was extended to include France and Germany (Mason et al., 1993). Second, new and different industries have been added. Besides food processing in the aforementioned studies, this particularly concerns the service sector: insurance firms, and banks lending to mid-corporate (‘middle market’) business customers (both in progress). And, interestingly enough, the method has also been applied to various manufacturing industries (engineering, food drink & tobacco, clothing and furniture) in two regions of one (re-united) country: East and West Germany (Hitchens et al., 1996).
As each new industry requires its own kind of matching, this led to a number of innovations within the MEC method over time. In the first NIESR MEC discussed above, the researchers acknowledge that they might have matched the firms more closely (Daly et al, p. 49):

“…by looking, not at matched simple products, but at matched manufacturing processes in the two countries, such as the turning of metal on automatic lathes. Or perhaps even more narrowly, by looking at turnings out of suitably-alloyed steel bars within a limited diameter-range; or yet further, we might have specified the precise type of machinery. But there are disadvantages in going too far down that path. The more closely we define the process in terms of machines and materials, the more will its efficiency be predetermined by technical factors; and the less likely we are to discover differences in output rates and in manning requirements.”

The argument is neither very scientific, nor does it show a convincing trust in the method. Later studies fortunately did take up this path of even more precise matching, with interesting results. One example was already found in the previously discussed Anglo-German hotel-keeping comparison, where the researchers controlled for differences in product quality by using an available external standard (the Michelin guide).

In the food-processing comparison, that concentrated on the production of biscuits, the original Anglo-Dutch comparison showed a Dutch comparative advantage (in terms of tonnage) of 21% per man hour. But the researchers also observed that the British plants produced a greater proportion of simpler undecorated varieties and a smaller proportion of more complex (filled or chocolate-coated) varieties, which involve more production processes; those varieties that account for most expensive 15% of the tonnage produced in the Dutch sample accounted for only 5% in the British sample (Mason et al., 1992: 51; 60). As such differences were found of even greater significance in the extension of this study to France and Germany, this led the researchers to develop an explicit measure for the quality of biscuits. When differences in quality were neglected, the Dutch plants had an output that was some 25% higher than in British and French plants; these in turn had a 25% advantage over Germany. But the detailed information gathered enabled the researchers to classify the outputs of all 29 plants that were visited in the four countries into three different grades of product defined in terms of technical characteristics such as the number of processes involved
in their production and the types of ingredients and packaging materials used. These enabled them to estimate inter-country differences in average levels of product quality, by weighting the different quality-grades produced in each country by the retail price-ratios. And when adjusting for quality differences this way, quite different results emerged. Productivity was found to be highest in Germany: on average, German productivity was about 15% higher than in the Netherlands and France, and 40% above the British levels (Mason et al., 1993).

In the Anglo-Dutch-American precision engineering comparison, potential quality differences were addressed differently, by exactly that step that Daly et al. (1985) chose to forego: looking, not at matched simple products, but at matched manufacturing processes in the countries (Mason & Finegold, 1995). In each country, firms were identified that produce a particular type of products: centrifugal liquid pumps, industrial hydraulic valves and cold-coiled compression springs. A limited number of firms was sampled to cover a spread of plants in the inter-quartile employment-size range. First, detailed information about employment and production mix was sought by telephone. Subsequently, the firms were visited for semi-structured interview with senior managers and direct observation of production processes and work organisation on the shopfloor; there, it was sometimes possible to talk to production supervisors and other workers. Information on the education and training of workers in certain key occupations was obtained through a short questionnaire distributed by the manager to (a sample of) the individuals concerned. Because each establishment still produced products to a wide range of physical dimensions and other specification, it proved impossible to obtain meaningful measures of total output and labour productivity. Instead, Mason & Finegold (1995) moved on to compare direct labour inputs involved in specified sequences of operations in the manufacture of similar individual products: i.e. the coiling and grinding phases of spring manufacture, the machining of key components of pumps and valves, and their subsequent assembly. Detailed information was obtained on actual output rates and direct labour inputs, which lead to estimates of the average outputs per direct person-hour. In the end, one compares for example for the machining of a key component of a pump the average machine operation time for that part, divided by average number of individual machines a worker operates. Mason & Finegold (1995) find marked international differences in the organisation of work and the qualifications of workers in those key occupations. For instance, American operators on average operate 2 machines, but British and Dutch only 1.5; and the percentage of the workforce with no formal
educational qualifications and only on-the-job training is roughly 70% in the U.S., 59% in Britain, but only 22% in the Netherlands. The American establishments held a productivity advantage over both their Dutch and (even more so) British counterparts. But these predominantly stem from larger batch sizes and higher automation levels in American firms. In the case of matched machine set-up operations, for example, the actual times required to carry out given sequences of tasks in the U.S. were found to be on average much the same as in the UK, and about 50% longer than in the Netherlands. The American establishments lack craft-skilled shopfloor workers and supervisors as compared to the UK and (even more so) the Netherlands. But the larger scale of production implies that American shopfloor workers need much less flexibility (i.e. between different machines and products) than is required from them than from their European counterparts. In addition, a more systematic approach to on-the-job training in some U.S. firms counters the lack of craft training.

3 Other establishment comparisons

The NIESR was of course not the first to compare firms within an industry over different countries. Controlling for industry already implies matching, although this may be rather limited as compared to the more extensive matching attempts found in the NIESR studies in general and Mason & Finegold (1995) study in particular. There is no clearcut boundary that separates MECs from such other comparisons; they jointly form a continuum that runs from ‘rough matching along one dimension (industry)’ to ‘detailed matching along more dimensions’. While there are important advantages in detailed matching along more dimensions, other studies may bring different advantages. This section reviews a number of interesting examples.

3.1 The International Assembly Plant Study

One important line of research concerns the International Assembly Plant Study, carried out by the International Motor Vehicle Program (IMVP) at M.I.T.. IMVP originally was a five year research program sponsored by virtually every automotive company in the world, leading to the influential “The machine that changed the world” (Womack et al., 1990). It continued
as a centre for the study of industrial competitiveness sponsored by the Sloan Foundation, and has since hosted two waves of the International Assembly Plant study (i.e. MacDuffie & Kochan, 1995; MacDuffie & Pil, 1996). The first wave contacted 90 assembly plants, representing 24 producers in 16 countries, and approximately 60% of worldwide production capacity in the industry. 70 plants returned the questionnaire. All of them were visited for interviews by one of the two main researchers (MacDuffie & Kochan, 1995: 153-154). In the second round, date were gathered on 89 assembly plants representing 20 companies and 20; Over 50 plants were visited by the researchers (MacDuffie & Pil, 1996).

Disadvantages of this study as compared to the NIESR studies are that it did not compare labour productivity across plants, nor compare specifically matched pairs of plants within the sample. Advantages are, first, that the study generated more extensive and detailed data, and on more firms, than was possible within the NIESR studies. Second, by focussing one of the first and most ‘globalised’ industries, it was not only possible to distinguish firm-level effects from national effects, but also national effects based on the production location from national effects through managerial culture and policies.

Firm choices about production strategy emerge as the primary determinant of training. In particular, training is linked to the overall organisational logic of production, and not just the bundle of human resources policies. Technology (measured by a robotics index) does not influence training level. Limited support is found for national differences between production locations on training level, even aside from differences in production systems. U.S. firms do invest in training than their Japanese and European competitors. But ownership seems as powerful a channel for national effects on training levels as production location: Japanese-owned American-based plants train more, and U.S.-owned European-based plants train less than locally owned plants. Japanese-owned plants appear to train a lot because they rely heavily on flexible production, European-owned European plants and plants in the newly industrialised countries train more than their production approach would predict (MacDuffie & Kochan, 1995).

3.2. International comparisons in banking
The banking industry has not hosted such an extensive study on work organisation and human resources policies as the automobile sector (nor, for that matter, has any other industry). It has, however, hosted a number of interesting smaller studies. While methodologically not as interesting as the NIESR or International Assembly Plant studies, we briefly discuss a few of these, as they point out some important dimensions of difference not (as well) covered by previously discussed studies.

Quack et al. (1995) compare the developments in recruitment and training practices in German, British and French banks, based on a number of interviews with personnel and training managers in major banks in the three countries. Not surprisingly, these were quite different, reflecting different national education and training institutions. More surprisingly, while often similar pressures lead to changes in all three countries, change is occurring in different ways in each country. Part of this may again reflect traditional differences in national education and training institutions. But the important point is that these latter institutions themselves are also undergoing change, and that banks are often actively involved in getting institutions and regulations adapted to their own needs. Quack et al. (1995) conclude that the sectoral level is an important arena where actors negotiate changes in regulatory systems between the firm and the national level. But, this does not only apply to education and training institutions, but sometimes also to key issues in the organisation of production/service delivery. This appears particularly relevant in banking. Contrary to manufacturing, where each firm is solely responsible for the quality of its own products, in banking, product quality to some part is crucially dependent upon mutual co-operation. I.e., my ATM card will be more valuable to me if I can use it at any banks’ ATM. The history of product and process innovations in the automation of financial transactions in the Netherlands provides a nice illustration of the delicate relations between firm’s individual strategies and their joint co-operation (Tijdens, 1992). Banks of course, as well as any other firms, pursue their own automation procedures in front- and back-offices, and this has been found to affect the qualitative mix of their labor demand (De Grip & Groot, 1990). But several key product and process innovations, that decisively influence changing labour demands, could only be achieved through co-operative efforts at the sector level.

Keltner (1995) interviewed 60 bank executives and managers in Germany and the U.S., as well as several industry consultants and representatives of employers’ associations and unions.
He tries to “…explain the contrast between the stable market position of German banks and the declining fortunes of their American counterparts….” (Keltner, 1995: 45). While external factor have a role to play (i.e. the fact that American banks were only allowed to enter the rapidly growing markets for investment and insurance products at a relatively late date).

Keltner stresses the importance of banks’ own strategies and choices. German banks invested heavily in human capital and the organisational capabilities necessary to pursue a strategy of ‘relationship banking’. Extensive apprenticeship training and ample opportunities for upward mobility of their employees were crucial parts of this strategy. And by offering their customers high levels of financial advising, quality service, and the convenience of one provider for financial products, they managed to retain their competitive position relative to other suppliers of such services. American banks invested heavily in information technology and rationalising employment, but in the process lost some things that proved to be main sources of competitive advantage: advisory quality, and customer contact as a means to generate market information. They chose to compete on price and convenience, and their customers found that other financial providers could do as well in these areas. One lesson to learn from this study is that high labour productivity in current tasks, while important, is not the only relevant economic performance criterion for a successful human resources strategy. In line with Keltner’s analyses, Paauwe & Williams (1998: 71) see banks gradually turn into labour intensive firms where a large share of the employees has an important effect on a bank’s economic performance.

4 A critique of the matched establishment method

The NIESR MECS have many advantages. First of all, given the importance of work organisation for both (the demand for) qualifications and economic performance, a distinct advantage lies in the focus on particular industries. By controlling for industry and fundamental technology, it becomes possible to explore both national and firm-level factors more in-depth than at an aggregate level. In addition, measuring physical labour productivity achieved in key jobs as well as the qualifications of the related workers provides a substantially firmer basis for establishing the relation between qualifications and productivity than measuring a monetary proxy at the aggregate level of the firm (or even higher). Matching firms (or even specific production or service processes) make it possible to focus on the
relevant topics at hand and exclude other factors (i.e. size) that influence labour productivity. And taking time to visit firms to directly observe work processes and interview key personnel, rather than solely relying on a questionnaire.

So the MEC method is certainly powerful. But no method is perfect, and the MEC method as it has been implemented so far, also has its limits. One obvious limit is the limited number of firms in the samples. This is of course not an intellectual shortcoming, but a practical and financial one. Alas, the International Assembly Plant study will probably remain one of the very few exceptions where abundant resources allow in-debt studies of a substantial share of all firms worldwide in a particular industry.

One thing that can be considered an intellectual shortcoming is that MECS so far have not attempted to measure the costs of the labour inputs (gross wages). Comparing labour productivity (the physical production per person-hour) is nice, but comparing the production per dollar of labour input would even be nicer. Firms might be reluctant to give information on both labour productivity and wages; but, first, confidentially is already an issue with information on labour productivity alone, and, second, one might at least try.

Second, the analyses of firm’s strategies in general, and their internal labour markets in particular, is rather limited in the NIESR studies as compared to the studies reviewed in section 4. The focus of the MECs has been on establishing the pool of formal qualifications within a firm at the time, not on explaining how this came about through training and (spontaneous and intended) in- and external mobility. Firms’ training policies are not reviewed in-depth, and other human resource policies and productive and competitive strategies receive even less attention. Researchers that have experience with the method indicate that, for this reason, it might be an improvement to include (even) less firms in future MECs, but analyse each of them more extensively in these respects.

Third, the influence of external institutional arrangements (i.e. labour law, cross-firm collective bargaining agreements) as an ‘ultimate cause’ behind the proximate cause of work organisation is largely neglected. The International Assembly Plant study found both firm ownership and production location to be important, with Japanese firms opting for flexible production strategies. The banking studies discussed in section 4 pointed out the importance of education and training institutions; of product/service regulation; of industry-level co-
operation to enable product and process innovations; and other elements we did not review here. Firms are formally free to choose any productive strategy they desire; their institutional environment may severely hamper some of theoretical options; but then again, firms themselves can also actively intervene with this environment. More insight into empirical choices made by various firms in various contexts should enhance our insight beyond this very global level. Paauwe & Williams (1998: 68-70) provide an interesting attempt at developing relevant hypotheses here, by distinguishing various types of markets and competitive situations and linking these to various human resources strategies.

To extensively incorporate all these additional or improved factors in the MEC method would require unlikely extensive funds. Lacking those, it seems impossible to incorporate them all without sacrificing the current strengths of the method: a decent measurement of a the qualification structure of (matched) firms’ workforces, and the physical labour productivity achieved in key jobs. But one can try to modestly improve on the approach in one or more of these respects, by keenly customising the approach to the industry at hand. We have shown that the MEC method has already been improved in small steps over the last two decades, and it seems wise to continue that route. A survey by Osterman (1995) on the relation between skill, training and work organisation, based on telephone interviews with a representative sample of larger American firms, provides a number of interesting suggestions for relatively easy-to-measure variables that could be incorporated into future MECs.

The first series of NIESR MECs on Britain and Germany shows how informative this may be of a country’s relative competitive position in workforce skills and labour productivity. Besides the two studies discussed in section 2.3, the Netherlands has only been involved in a small parallel study to the hotel-keeping MEC discussed in section 2.2 (Lont, cited in Prais et al., 1989). Five Dutch hotels were compared to five British hotels, and the former appeared to have very similar Manning levels to their German counterparts. While the findings so far are quite comforting for the Netherlands, the increased importance attached to skills and work organisation for economic performance warrant additional MECs, in particular in other labor market segments than manufacturing. As Dutch relative advantages in labour productivity appear to be concentrated in manufacturing, while labor productivity in services is lagging behind (CPB, 1998), a service industry would be an interesting first candidate for this.
References


1 Measuring labour productivity in service, though, is notoriously difficult, and some suspect that productivity growth in services is underestimated.

2 These used to be called ‘matched plant comparisons’, reflecting the fact that these studies used to focus on branches within manufacturing. As such comparisons have also been carried out for service branches, the term ‘matched establishment comparisons’ is preferable and will be used here.

3 Throughout this paper, the word industry refers to a specific, narrowly defined subset of economic activity. It has no particular connotation to the industrial sector (which we will refer to as manufacturing). It refers to subsets of economic activity within manufacturing as well as within the service sector.

4 Prais (1995a) and Prais (1995c) offer reprints of NIESR articles in this area over the eighties and early nineties, respectively; Prais (1994) offers an overview of the work up till then.