

Game, set and match to men?

Every avid sports fan knows the experience of watching their hero choke at the worst possible moment in a match, just as the pressure is at its most intense. In a new Discussion Paper, CEPR Research Affiliate **Marco Daniele Paserman** examines whether this phenomenon can tell us something about how men and women perform in fiercely competitive environments.

Using high pressure Grand Slam tennis matches as live natural experiments, Paserman has studied when, and how often, players crumble and make so-called 'unforced errors' when the competition is tough. He has studied every point, in every match, at nine tournaments played between January 2005 and January 2007, classifying the points according to how important they are to winning the match.

The analysis shows that all players tend to perform worse in the final, decisive set - but the importance of the point tends to affect the performance of female players more than their male counterparts. Men show the same propensity to make an unforced error throughout the match, but women are significantly more likely to be pressured into mistakes during the most crucial points.

As the pressure mounts, and the points become more important, women also tend to adopt a more cautious, conservative style of play: their serves get slower, and rallies become longer. Paserman uses game theory to show that this may simply be a perfectly rational response to a situation where the player knows she is prone to making unforced errors.

However, he suggests that his key finding, that men's performance is less adversely affected by the pressure of competition, may have implications far away from the tennis court - in the workplace.

Tennis involves physical prowess and split-second reactions, which makes it unlike most day-to-day jobs; but Grand Slams do involve tough competition and large monetary rewards. Paserman's findings about men's and women's responses to highly competitive situations are strong enough to give the beginnings of a possible explanation of why more women have not

broken through the 'glass ceiling' to reach the very top of public and professional life.

There are at least two possible interpretations, he says. The first, and more controversial, is that differences in performance under pressure, of the kind exhibited by tennis players in his research, are important to how well workers perform their jobs. In that case, perhaps men simply reach the top of the career ladder because they win through in a competitive environment, while their female colleagues 'choke', meaning that men are better at their jobs.

On the other hand, perhaps performance under pressure isn't really crucial to whether or not someone is a productive employee; but nevertheless the internal 'tournaments' within firms, to determine who gets promotion, are structured too much like games. If that is true, and women shy away from the competition, or adopt a less aggressive strategy - as they seem to on the tennis court - they may simply fail to win the promotion game, even if they are just as productive.

Business life is riddled with sporting metaphors about 'level playing fields', 'straight bats' and being 'on the winning team'. But if Paserman's second interpretation of his results is correct, it could be that the prevalence of sporting language reveals something more serious about the underlying structure of the workplace: it's all too true, far away from the sports field, that the winner takes all.

DP 6335: Gender Difference in Performance in Competitive Environments: Evidence from Professional Tennis Players by Marco Daniele Paserman

IN THIS ISSUE

- Game, set and match to men? •
- The rise and fall of the clerk •
- What's in a name? •
- Getting down to the business of corruption •



The rise and fall of the clerk

When Adam Smith used pin-makers to illustrate his powerful insight that splitting a job into separate, specialist tasks got it done more efficiently, he could already identify 18 separate processes involved. More than two centuries later, when factories make products as diverse and complex as computers and pharmaceuticals, there are many thousands of different tasks – and someone has to keep track of them all. CEPR Research Affiliate **Guy Michaels** analyses more than a century's worth of data to show that this ever more complex division of labour led to the rise of a new breed of worker – the clerk.

A clerk is not a manager who supervises manufacturing workers, but an administrator who organises the information needed to keep everything running smoothly: a shipping clerk, perhaps, or a book-keeper or secretary.

Michaels first tests the idea that as manufacturing processes became more complex, there was an increasing demand for information and coordination to ensure that raw materials, workers and other resources were always in the right place at the right time – and as a result, a growing need for clerks.

He constructs a measure of the relative complexity of different manufacturing processes, using the list of the various occupations involved in each industry, excluding clerks and managers. The more different types of workers involved, the more complex the manufacturing process, and the division of labour. With data from both the US and Mexico, he uses this measure to confirm that, in general, the more complex industries are also those which tend to employ more clerks.

This insight helps to explain the increase in white-collar workers as a proportion of the workforce over the past century and a half. As manufacturing became more complicated, and its labour force more segmented, the need for administrative staff to coordinate the process increased rapidly. Between 1860 and 2000, the proportion of the manufacturing workforce employed as clerks increased from less than 1% to over 11%.

At the same time as manufacturing has become more intricate, the equipment available to the white-collar workers to keep the process running smoothly has been transformed. The Victorian shipping clerk's ledger has been replaced by a spreadsheet.

As well as confirming the general intuition that more complex manufacturing industries lead to the employment of more white-collar workers, Michaels examines a specific period when new technologies cut the costs of storing and using information. Suddenly, this made it more profitable to operate complex, 'information-intensive' manufacturing processes – and to employ more clerks.

Between 1880 and 1910, he argues, there was an early 'IT revolution' as typewriters, telephones, early copying machines and vertical filing systems swept into offices across the US, making it practical to reproduce and store large amounts of data.

As a measure of the rapid pace at which they spread, the real value of these early hi-tech machines increased at an average annual rate of 16% between 1890 and 1909, compared to just 3% over the next five years. And along with these revolutionary new inventions came the need for workers – clerks – to operate them.

Clerks were almost non-existent in 1880, when 95% of the manufacturing workforce were production workers, and most of the remaining 5% were either managers or owners; but by 1910, when the early IT revolution had run its course, there were twice or three times as many clerks as managers in manufacturing.

Industries that were already operating a thorough division of labour by 1880 absorbed and made use of the new technologies most rapidly, increasing their employment of white-collar workers fastest.

Michaels even suggests the soaring demand for these relatively educated staff, at a time when high school graduates were in short supply, may have helped to increase the pressure for universal schooling in later decades.

Clerks may have been the winners from this early IT revolution at the close of the nineteenth century, but Michaels also examines a more recent wave of technological change and finds that today, the power of the clerk is waning.

When computers burst into the workplace, the price of processing information dropped again, as it had at the time of the earlier IT revolution. Clerks were early users of this new technology: more than half of them were using computers by 1984, compared to a quarter of other workers. But Michaels shows that where the typewriter and the vertical filing system suddenly made more white-collar workers necessary, more recent developments have rendered some of them obsolete. The fraction of clerks in the manufacturing workforce declined from 14.4% in 1960, to 11.4% in 2000. At the same time, clerks' wages have been falling relative to other manufacturing workers.

Michaels identifies three explanations for this decline. First, some IT equipment simply replaces clerks directly: computer software can calculate the price of an insurance policy, instead of a specialist doing it by hand; the shipping clerk has been superseded by inventory management software.

Second, new equipment has made clerical work faster and more productive, so fewer staff are needed to do the same job. Finally, some information processing tasks

have been taken out of the clerks' hands: typists are no longer necessary now that anyone in the office can tap out a letter on a word processor.

Just as more complex industries responded most rapidly to the sudden availability of typewriters and telephones in the earlier IT revolution, this time the more sophisticated sectors have been quickest to embrace computers, and keenest to lay off clerks as a result.

At the close of the nineteenth century, as the telephone, the typewriter and the filing system burst into the office and transformed working life, the number of clerks expanded rapidly alongside the tools of their trade. But once the computer revolution swept through the US in the late twentieth century, the clerk

and the latest bit of hi-tech kit were substitutes, not complements: a typewriter cannot do your job for you, but a sophisticated piece of software can.

Michaels' century-long story of the white-collar army of clerks, whose heyday appears already to have passed, gives a glimpse of much broader changes in the workforce – and society – which can still be explained through Smith's insight that the division of labour is at the heart of economic life.

DP 6358 – The Division of Labour, Coordination, and the Demand for Information Processing by Guy Michaels

What's in a name?

When parents lovingly bestow a name on their new-born child, economics is presumably among the last things on their minds; but in a new CEPR Discussion Paper, Research Affiliate **Thierry Mayer** and his co-author **Keith Head** argue that trends in name-choices – in this case, in France – have much to tell us about social interactions and influences that have profound effects in the world of markets.

Economists have repeatedly found in recent years that despite the relentless progress of globalisation, falling transportation costs and lower trade barriers, distance still matters. Despite the existence of the single market, for example, European consumers show a stubborn preference for home-made products instead of foreign goods, while firms are surprisingly determined to bear the heavy costs of staying in overcrowded mega-cities, instead of fleeing to cheaper locations elsewhere.

Many of the findings in this area of 'economic geography' suggest that non-market factors – such as upholding traditions, or keeping up with the neighbours – spill into markets, and have important effects which economists need to understand better.

By examining the resolutely non-market issue of what names French parents gave their children between 1946 and 2002, Head and Mayer are able to shed some light on which of these factors may be important.

In order to measure the relative importance of conflicting influences, the authors identify three groups of names. Saints from the French calendar are the traditional source of names, sanctioned by legislation in 1803 that limited parents' choices. Some latitude was allowed for the foreign-born, but only as recently as 1993 were parents allowed to pick any name they wanted, so saints' names are the time-honoured choice.

The second group of names is Arabic ones – those

likely to have been selected by immigrants from France's former colonies in North Africa, who began to arrive in the 1960s. Third, the authors look for the prevalence of 'American' names: those that are more common in the US than in France, and may signal the influence of globalisation, as parents encounter non-French names in popular films, songs and so on.

Having isolated these three groups for analysis, Head and Mayer examine how prevalent they are in each departement across France, over time. Not surprisingly, the popularity of saints' names has declined since the post-war years, while American names have become increasingly common. Arabic names have been given to a similar share of new babies over time, but – again not surprisingly – there are wide variations across departements, depending on their immigrant population.

As well as examining trends over time, the authors bring the concept of distance into their analysis. Using a mathematical concept called 'Manhattan distance,' they are able to measure how strongly the proximity of two different regions influences the likelihood that they exhibit similar naming patterns. They can then compare the power of this distance-factor with the importance of other influences, such as social class and national origin.

This analysis shows that distance certainly still matters. When new American names have become more fashionable in one departement, increasing in popularity by, for example, 10%, neighbouring areas have followed the trend and the prevalence of American names has increased by an average of 3.5%. That suggests that social interactions – what the other people you meet are calling their children – remain important. The decline in saint's names has also

travelled from one département to those nearby.

However, this distance-factor has become less crucial over the years, while outside influences have become more important, as the rising popularity of American names suggests. The increasing availability of televisions, cars, the internet, and a host of other means of communicating with people far outside the immediate environment has helped to bring other influences to bear.

Some of the factors that have become more important, as the power of proximity has waned, are surprising – it is not simply a story of the homogenising power of globalisation. Head and Mayer find that social class has become increasingly relevant in determining name choice, and so has ethnic origin (as evidenced by the behaviour of Arabic name choices, which are not diffused to neighbouring départements, but tend to be chosen only by those with a shared origin).

When they extend their analysis across national borders, the authors find that language barriers are also important: French names are more similar to those in Wallonia, the French-speaking part of Belgium, than those in Flanders, the Flemish-speaking part. But again, distance still matters: Walloon names are more like

those of their French cousins than Corsican names, despite the fact that Corsica is officially a French département.

Naming a child is a quintessentially private act – a matter of taste; but Head and Mayer are able to show that it is affected by a number of other social factors. The importance of face-to-face contact in passing on preferences has declined over the years, while a fashion for American names has sprung up.

But the importance of keeping up with the neighbours has not simply been replaced by the pull of exotic names from films or pop music: instead, traditional factors such as social class and ethnic origin have exerted an increasingly powerful sway on parents' choices. These influences are likely to affect many other choices, in the realm of the market as well as the home. Disentangling them is the challenge economists face if they want to understand why sometimes, people refuse to be guided by market signals alone.

DP 6340: Detection of Local Interactions from the Spatial Pattern of Names in France by Keith Head and Thierry Mayer

Getting down to the business of corruption

Fighting bribery and corruption is one of the toughest challenges facing governments in many developing countries, but CEPR Research Affiliate **Benjamin Olken** and his co-author **Patrick Barron** believe economics can help. They have conducted an extraordinary experiment in Indonesia to prove that although corrupt officials may be outside the law, they are not beyond the reach of market forces. In fact, Barron and Olken found that individual bribe-takers seem to behave rather like firms operating in a market, trying their best – sometimes in quite sophisticated ways – to maximize their 'profits'.

In the experiment, volunteer surveyors accompanied truck-drivers on more than 300 journeys along two routes through the Indonesian provinces of Aceh and North Sumatra, recording the level of bribes they paid at checkpoints and weigh-stations along the way. On average, drivers were forced to pay \$40 – around 13% of the total cost of the trip. The results make clear there is some bargaining process involved: the 'price' of passing through a checkpoint or weigh station is not simply set in advance. Where, for example, the corrupt official involved has a gun – a very obvious demonstration of his bargaining power – the value of

the average bribe increases by 17%. Having another person manning the checkpoint also helps the bribe-takers to make their case: one official can spend time haggling with a truck driver, without fearing that another driver will slip past.

Accordingly, the average bribe increases by 5% for each extra member of staff present. But bribe-takers – and payers – are also responding to much more subtle signals than who is waving a gun. During the period covered by the experiments – November 2005 to July 2006 – the Indonesian government withdrew 30,000 police officers and troops from the province of Aceh, as part of the peace agreement ending a 30-year long civil war. On the section of the truckers' route passing through Aceh, the number of checkpoints dropped dramatically as a result, so that the average journey involved 15, instead of as many as 40 before the withdrawal.

Corrupt officials along the rest of the route, through North Sumatra, responded just like good profit-maximisers: knowing that truck drivers were facing lower bribes elsewhere, they demanded more cash for themselves. However, the total amount paid in bribes did fall after the troops were withdrawn. The authors

say that this suggests 'pricing' decisions by corrupt officials are decentralised: if an organised criminal gang were coordinating the collection of bribes, they would probably simply have made up every dollar they lost in Aceh, on the North Sumatra side of the border.

It also appears to matter at what stage on a truck-driver's journey a particular checkpoint occurs. At least on one of the two routes examined in the study, the later in the journey an official tackles the driver, the larger a bribe he is able to exact.

This is an example of what economists call 'double marginalisation': firms at different positions in a supply-chain are able to exert different levels of market power. Earlier in the journey, both the bribe-taker and the truck driver know that he is facing further checkpoints later in the route. Again, corrupt officials, working outside the law, appear to be mimicking the behaviour of profit-maximising firms.

As well as taking into account prevailing market conditions - such as the number of other checkpoints faced by the drivers, and the stage of their journey they have reached - corrupt officials showed evidence of using another, more sophisticated tool of the successful firm: differential pricing.

Just as airlines charge business passengers many times the price tourists are willing to pay for a flight, the corrupt officials at checkpoints seemed to be trying to adjust the size of bribes to fit truck drivers' ability to pay up. Hence having a new, shiny truck or carrying a particularly expensive cargo were both likely to incur a heavier bribe.

In one case, officials at a weigh-station at Gebang, in North Sumatra, had even gone to the lengths of offering two alternative tariffs: for a fixed fee, drivers

could purchase a date-stamped coupon from a criminal organisation in Medan that would limit the total price they were forced to pay for having an overloaded lorry once they arrived at the weigh-station.

In fact, drivers didn't seem to be particularly accurate at choosing the cheapest tariff to suit their particular load; but the existence of the complex pricing system suggests officials are at least trying to differentiate between different types of 'customer'.

One result of this meticulous examination of the behaviour of corrupt officials is to show that intuitions and models usually applied to firms also have relevance in much less conventional spheres, and even beyond the law.

The findings also have important practical implications for developing countries struggling to tackle corruption. Given that, in this case at least, the 'pricing' behaviour of corrupt officials is decentralised, for example, fighting corruption by attacking it 'at the top' may actually fail to reduce the total amount taken in bribes.

Second, although the North Sumatran officials did increase their takings when the Aceh checkpoints were reduced, total bribes paid declined. That suggests that simply cutting the number of potentially corrupt officials the public have to encounter is a good idea. Barron and Olken's analysis shows that when governments of developing countries are designing anti-corruption crackdowns, they need to think carefully about the market for bribes.

CEPR DP No. 6332 The Simple Economics of Extortion: Evidence from Trucking in Aceh by Patrick Barron and Benjamin Olken

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