

## **The digital traces of society – the way forward for Quantitative Marxism?**

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This paper have three main objectives:

First of all to briefly describe what kind are created by thorough going digitalisation of information in modern society. By digital traces is meant all the data registered when we use credit cards, mobile phones, when transactions between firms are registered etc.

Secondly – and the main part of the paper - to illustrate the potential use of these digital traces - in the form of micro data from the National Statistical Offices – to show that they open up quite new possibilities to enrich Marxian social science. This is due to an exponential growth in observations. There will be no more small samples. There will be a full count; that is – detailed information about persons, firms and their relations. One gets timestamped data – which are so important when one wants to look at causality chains. Annual – even quarterly statistics are not a (causal) chain of events. One will also become less dependent on high-level statistics created with a neo-classical, main-stream economic model in mind.

Third and last objective is to discuss the rather paradoxical situation on the left regarding the use of micro data. On the one hand all left wing social scientists want micro data for research, but at the same time there is – over a beer or a glass of wine - a widespread fear of “Big Brother Watching You”. This (irrational) fear for “Big Brother” society is an obstacle for the development, collection and use of such data. The left needs to change its attitude from a vague fear to a rational program taking both care of privacy protection and the use of such data for social science research. With micro data based on digital traces the social sciences will become much more “scientific” and that benefit – for all kind of progressive causes - is much greater than the “downside” which is there already. It is just a fact of life that police and secret services will have access to and use such data. The key to improve the situation is of course democratic control over the use of such data. That means really practical, hands on control by democratic institutions. How such a control can be implemented is briefly discussed.

### **Dunne and the state of the art anno 1990**

Computers have been around since the second world war, but the digitalisation of society’s information exploded exponentially in the late eighties early nineties. Already in the fifties the government had their huge census and tax databases that often based on punch card systems. In the eighties – with the introduction of PC’s – things started really to take of. With the spread of the Internet, the general miniaturisation of electronics, including mobile phones the amount of digital traces went into a big bang. It is useful to contrast the situation today with the state of the art in 1991. But let us first look at the state of the art at that time on a more general conceptual level.

In his introduction to Quantitative Marxism (QM) Paul Dunne argued that one effect of the marginalisation of the Marxist “revival” in economics and social science was that:

Marxist took a dismissive approach to the orthodoxy, which often came across as a detached arrogance and superiority of understanding of how the world works. The tools and data of orthodox analysis were not considered of any value or interest, since

many Marxists would argue that the very attempt capture the dynamics of capital accumulation with statistical analysis and the available data was useless. The available techniques and the data focus on appearances, with the data being merely phenomenological forms which give little insight into what is happening. (Dunne 1991, p. 2)

I agree generally with Dunn's conclusion that "such anti-quantitative ideas are misplaced and indeed have been and indeed have been damaging to the development of Marxist economics." (p. 3), but there are still enough examples of rather uncritical use of in particular static econometric models which presupposes equilibrium; and to a somewhat lesser extent uncritical use of official statistics and conventional indicators. I follow Dunne in pointing out that:

"At the risk of oversimplification, we can characterise the major features of Marx's method as follows:

- the distinction between appearance and essence
- the treatment of economic processes as historical and social
- the use of dialectical analysis, developed from Hegel, using a materialist interpretation" (p. 3)
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I will try to illustrate that if a neglect of empirical work was regrettable twenty years ago, it would be almost criminal today, given that digital traces give so incredibly much more data to analyse, among other things the relation (distinction) between appearance and essence, to analyse the economic processes in great historical/social detail – and that used in dynamic models, in form of simulation, dynamic statistical techniques are tools that are much more appropriate for Marxian/Radical social analysis than static, linear models.

Dunne also pointed out that:

Orthodox measures are not unproblematical observations, as the history of the national accounts shows (Kendrick, 1972). The orthodox has the advantage that large amounts of resources are devoted to collecting its information and people have become used to taking the highly abstract categories, like gross national product (GNP), for granted. In attempting to measure Marxist concepts, it is really a matter of where in the move we bring in the Marxist interpretation. If Marxist had the same resources they could improve their data collection, but as things stand they usually have to rely on adjusted orthodox data. Nevertheless, as long as care is taken a lot can in fact be done... (p. 9)

The point is that with digital traces on is at a much "closer" to reality, at a level of very elementary, one-dimensional (undistutable) facts. This means that orthodox concepts do not filter the perception of reality that much and consequently that various conceptual structures can be use to aggregate them. such aggregation is indeed necessary because without being placed in a hierarchy of concepts (an ontology) the individual data do not make sense.

This in contrast with "analog" – that is survey data, where the questionnaires frames the data to be collected, which always are on a much higher level or aggregation/abstraction and therefore tend to have more build in ideological bias.

## **Digital traces...every step you take, every breath you make**

As we all know we live in a society where ICT is such an integrated part of every day life, that “every step you take, every breath you make” there will be a computer “watching you”, that is storing data about a lot of aspects of our lives. Actually my mobile phone registers (or try to do so) all the steps I take during the day. I do not know if it is actually done for any purpose, but to measure the breath is no technical problem. A pulse clock will measure your pulse etc. It could easily be collected via the Internet.

For QM it is of course the digital traces related to the production, exchange and reproduction going on in a capitalist economy that is of most interest. The amount of data about economic transactions that are stored in digital form is breath-taking. Every product you buy using your card, everything done electronically between firms – including public entities are registered.

If one asks the simple question – do we have good data regarding the hours worked and wages paid for those hours? The answer is – relative to what is currently technically possible – a clear no. That means that in order to advance research on core Marxist and feminist the digital traces, transformed by National Statistical Institutions (NSIs) into micro data will be of great help.

Regrettably in most countries most of the labour marked data, most of the data on production is from surveys. The labour marked data is from the Labour Market Survey (LFS). The LFS – with its clear Keynesian origin is focussed on measuring the level and change in some aggregate labour marked measures, number of employed, unemployed, persons actively seeking work etc. But – and there is a great BUT regarding LFS, the sample is not more than 0,5 % of the populations. Which means that as soon as you start breaking down on sex, age, industrial sectors, education there are too few persons in each subgroup to allow for analysis of trends.

The Norwegian LFS has a sample of 22.000 and there is around 3,5 mil. persons in total. The LFS only follows persons for 8 quarters, the register files follows people continuously from birth to death, including their educational and labour market careers. This opens up for studying labour marked related issues – how do immigrants succeed on the labour marked? Where do where do the female Master students of ICT end up? Or school drop-outs – where are they 5- 10 15 years later. Or compare the careers and earnings of male and female engineering graduates etc.

Although most countries actually do collect such data, so far it is only in the Nordic countries where register data is available in long time series for the whole labour marked. I shall not try to explain why only the Nordic countries so far are using micro data as the basis for their statistical system, census, business register, structural statistics etc. The important point is that the digital traces are produced in most countries; no modern country can have their tax files on paper. But there is a “leap” from having the digital traces and to real, accessible micro data.

## Micro data and the classical Marxist controversies

### Simple and complex labour

The problem of quantifying the relation between simple and complex is important. It is actually – as argued among others by Jon Elster (1985) prior to the transformation problem. Elster wrote: “I conclude that the presence of genuinely and irreducibly heterogeneous labour is a major stumbling-block for Marxist economics. If taken seriously, it prevents the labour theory of value from even getting off the ground, since the basic concepts cannot be defined.” (Elster 1985)

If we look closer to the traditional Marxist “controversies” – for example the question of simple and complex labour we see that this debate was (it has died out) conducted at a very high level of abstraction<sup>1</sup>. A theoretical/conceptual debate is certainly needed – Marx left us only fragments on how to solve this question. The traditional argument – with a certain amount of textual support in Marx writings - was that one hour of complex (skilled? ) labour could be calculated as a multiple of hours of simple labour, what one could call the “reduction coefficients”. It was symptomatic that those who favoured the view that complex labour contributed more labour value per time unit because more labour (complex? educational) power had gone into its production it was typical that no effort of quantification was undertaken.

This quantification was not done because Marxists did not see the importance of the problem, but as Gouverneur (1990, p. 5) wrote:

“It is commonly accepted that skilled labour (‘complex labour’) creates more value (is more productive) than labour without special skills (‘simple labour’): hence the problem of reducing units of complex labour into units of simple labour. In the same way it is commonly accepted that more intensive labour creates more value than less intensive labour: hence the similar problem of reducing different kinds of labour of varying intensity to a common standard. *The difficulties of solving these problems at an empirical level are such that measuring quantities of value (not of concrete labour) appears to be impossible.* (My italics)

Other authors seem to be more optimistic. In Dunne’s anthology, Alan Freeman (1991) writing on the National accounts in a footnote states that “Throughout this chapter we make no attempt to correct for skilled or complex labour. In any complete analysis, above all in inter country comparisons; this would have to be done.” (p. 105)

The other side of the debate that – argued that this notion that complex labour produced more value per hour – comparing not only workers making a certain product with certain tools, but comparing jewellers and damask weavers do not make sense<sup>2</sup> would also benefit from using the labour market micro data, where you know annual wages, education, where you have detailed records of hours worked – of course dependent on the measurement system used – but still very detailed – and detailed information about process (machine type, year of purchase) and product (labour content, physical characteristics). One could look at changes in occupational code for one and the same person with the same abilities. As noticed above, the numbers and pace of the steps, the rhythm of the breath – indicators of the intensity of work

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<sup>1</sup> See for example Hilferding (1975), Roncaglia, Alessandro (1974), Bowles and Gintis (1977), Rosdolsky (1977) Rowthorn (1980) Steedman, Ian, (1980, 1985)

<sup>2</sup> Itoh (1988), Farjoun and Machover (1983)

can also be measured without any prohibitive cost. If such data are meaningful – that depends on the analytical question. It is often argued that the tempo today is higher than it was in the golden decades after the 2<sup>nd</sup> WW. The point is that we are – even in the Nordic countries – far from using more than a few of the work related digital traces. There are still very “rough” wage data, the hours actually worked each day, week and month are mostly imputed etc.

My hunch is the simple - complex labour problem is more likely to be solved if one uses the micro data that are – and will become available.

### **The transformation problem – the labour content of goods**

The transformation problem (TP) is without doubt *the* problem in Marxian economics, and of course its solution is not to be found by only getting more and better data<sup>3</sup>. But using the Marxian method of “Realabstraktion”, that is to build concepts in an “interactive” way reflecting back and forth between theories and “stylized facts” might give a lead to where the solution might be found. One wonders if people so easily would use a uniform rate of profit if they really had looked at real life micro profit rates.

The fundamental problem with the TP debate is that utterly static equilibrium models are used to model a dynamic phenomenon – how privately produced goods gets their social recognition (= being sold) through an trial and error process where technological innovation constantly disrupts any price from becoming a centre of gravitation. This means that most – if not all of the preconditions for a Bortkiewicz, Sraffa, Steedman (1977) like solution is not present – or at least has to be discussed at length why they are fulfilled at a high level of abstraction:

Micro data will show that:

- Profit rates are not equal in the economy, not between industrial sectors, not in branches. They show no sign of equalising since endogenous technological change disrupts the unquestionable real process of equalising.
- Most products are not “basic”, i.e. are used in production of other goods, so the A-matrix in a real economy is much more “fragmented” than in the 3-sector model. But still profit rate differentials influence investment decisions.
- With micro data you would see firms making the same product have very different organic compositions due to radically different (generations) of technology. This in contrast to most “models” used to discuss the problem. They do not use any real numbers for the actual organic composition of even very aggregate branches; it is mostly small, cute numerical examples.
- The enormous importance of sunk and fixed and costs like R&D, machinery that can only be sold with a considerable (total) loss leading to falling unit prices (increasing returns to scale) and making the supply curve falling.
- One could get much better data on working class militancy; number of day lost in strikes for each individual, for each firm etc.

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<sup>3</sup> See for example Howard and King (1989) for an overview of the debate and Kliman (2007) for a good intro to the issues and a solution of the TP that points in a dynamic and generally correct direction.

Many other aspects of the TP problem could be mentioned, but I will focus on one set of phenomena, different technologies and different labour content. My approach to these issues is inspired by Farjoun and Machover's book from 1983 "Laws of chaos". F&M treats the labour content of goods as at stochastic variable, but before starting with thousands of goods and an approach inspired by statistical mechanics, let us look at a particular good, let's take woven cloth. Originally both the spinning of the thread and the weaving was handcraft, every producer was basically on the same technological level.

But soon as you get manufacturing, get modern "Fordist" industry there will at all times be various technologies producing the same good resulting in very different labour content. Or take beer – where the product is almost unchanged for centuries – and where breweries has become more and more automated – but not at the same pace and still today there is both enormous breweries and micro breweries. The point I am getting at that the great differences on labour content possibly make any "social average labour time" meaningless.

The reason why those with very capital intensive plants and consequently very low unit labour cost might not outcompete the small firms immediately – or maybe themselves by outcompeted is that they may have a heavy burden of interest to pay. But all that you can learn from the firms accounting data, which you can get in the most minute detail. With product nomenclatures you can get a very precise picture of the technology of each individual firm.

This means that the labour content in a Farjoun and Machover sense can be calculated with very high precision. Value transfers from various sectors can be studied. One of the most interesting results of from Farjoun and Machover, that anyone that has a wage that is more than twice the average will benefit from other peoples labour. One of the preconditions for that result is that the rate of surplus value (exploitation) is 100 %. With micro data one could calculate the rate of exploitation for each firm.

There is with a modern business register, with the logistics and sales data that is produced like bar codes (product identifier), customer databases (who you are selling to/buying from) there is no reason why the national accounts should not be build up completely from micro data. Instead of doing econometrics on time series with very few observations, where it is often rather artificially "backwards" estimated quarterly data that is used that makes one get a the bare minimum of observations needed to do some statistical analysis at all, and where there are all kinds of problems with the observations – not being really independent. With real microdata you would have millions of records for cross-section analysis each year, you will have long time series for each individual firm, for each individual worker.

## **Unequal exchange**

One important issue on the left has always been the question of unequal exchange. With micro data one could see both the difference in labour content of a rather similar products like Chinese bike and a French bike, the labour content of identical goods, like a certain amount of a certain standardised steel quality. One might then see that Chinese workers are giving more labour to us in form of their steel, than we give them in form of more high tech products. The same might be even "worse" in the case of handcraft products, like hand-knitted carpets. But to paraphrase Joan Robinson from *Economic Philosophy* (1962): *Economic Philosophy: ...the misery of being exploited by imperialism (capitalists ) is nothing compared to the misery of not being exploited at all.* Even if one views such an exchange of hand-knitted carpets as advantageous for the Chinese to quantify the amount of labour time offered by both sides might be politically very important.

## **A short comment on the computer science aspect of digital traces and micro data**

Although we leave digital traces each and every day by our daily activities that does not mean that they can be collected, aggregated and analysed in a meaningful way. What is needed is unique identifiers and nomenclatures that tell us what those identifiers mean from a human/social point of view. Basically there are three main groups types of numbers, persons, organisations (groups of persons) and things.

The easiest, most “robust” number is the person identification number, since we as individuals have clearly defined start and stop dates<sup>4</sup>. A person identifier might be a *pure* number or a number saying something about the person, in most cases date of birth and sex<sup>5</sup>. Organisations like firms, government agencies, journals – are more fuzzy, their origin is often not clear cut, there is almost always some predecessor, they might split (create a spin off). Even if a firm goes bankrupt – if a new firm is created using the same buildings, machines and workforce – is that actually a new firm? That depends of course on the analytical point of view. When it comes to “things”, it is of course both “things and actions”, goods, services and all kind of activities. There are bar codes for products, IP-numbers, MAC-numbers for various electronic “devices”, each phone call you make is a numbered thing, the plane tickets you buy, even the local sports club is online and your participation in the club championship is registered online. For studying the development of health, related to income and leisure time activities such data are of vital importance.

In order to give meaning such numbers must be given meaning by an act of social construction of meaning. There is a lot of “meaning” build into a business register by what data are collected about the firm. What one tries to achieve is to have categories and structures of categories that make it possible to ask in a foreign city, where is the closest pharmacy that is open, have the product I want – and please show me the way by public transport. The prime example of such efforts is the “Semantic Web” connected to the creator of the world wide web, Tim Berners-Lee<sup>6</sup>. It is way beyond the scope of this small paper to go into a discussion of various semantic approaches, technologies and strategies/tactics for getting them implemented on the myriad of web-sites. The point is that we can get a quantum leap in the social sciences, including Marxist social sciences, and as part of that – Marxist economics by using such semantically structured digital traces that is for short, digital traces that are collected using person, organisation and “thing” identifiers. The logic of the semantic web approach leads you to want a world person identifier, a World-ID. If you think this some Sci-Fi fantasy, you should get up-dated. There are serious EU conferences on World-ID in Sophia Antopolis each year<sup>7</sup>. For more than a decade there has been work in the EU on increasing the “interchange of data between administrations”, which presupposes a pan-EU person identifier for persons, firms etc<sup>8</sup>.

## **A short comment on the state of the art of collection of digital traces**

There has of course gradually been an increased use of digital traces by NSIs (National Statistical Institutions) in the nineties there was great hopes connected to the use of EDI

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<sup>4</sup> For an overview of the use of person identifiers: [http://en.wikipedia.org/wiki/National\\_identification\\_number](http://en.wikipedia.org/wiki/National_identification_number)

<sup>5</sup> Since people might change their official (not physical) birthdate and change their sex, there are arguments in favour of a pure number.

<sup>6</sup> See [http://en.wikipedia.org/wiki/Semantic\\_Web](http://en.wikipedia.org/wiki/Semantic_Web)

<sup>7</sup> See <http://www.smart-event.eu/world-e-id-program>

<sup>8</sup> See <http://ec.europa.eu/isa/> for current work programme.

(Electronic Data Interchange), see for example Bolster (1997). But besides the fact that all such processes involving institutions (firms, statistical offices, and authorities) changing their routines and habits – which take a long time – EDI was rather rigid and inflexible. It was a “column and row” format, instead of a more robust for changes “tagged” format like html/XML. Such formats or the Internet were not even mentioned in Bolster (1997). That situation rapidly changed in a special issue of Statistical Journal of the UN, (19, 2002) all the new Internet and SGML, html, ebXML lingo was there. Two of the authors, from the US Census Bureau started their article by saying that “Who would have thought a decade ago that the Internet and WEB-based technology would have the impact it on our lives that it has to day” (Schwartz and Hanckok, p. 153). But still there was – and is a lot of focus on questionnaires – not on transforming the digital traces registered “by life itself” into micro data.

Judging from the Journal of Official statistics there is still no real focus on digital traces. There is a lot of concern about “access to micro data” as can be seen from a special issue on that topic (Vol. 26, 2009/2010). But micro data here means only access to data about persons from the various surveys, Labour Force Survey, Household Survey etc.

To my knowledge there is still not any NSI that has a clear strategy for using digital traces, that is to get all electronic data connected to unique, standardised identifiers – there is no need to collect all of them in traditional sense. What is important is that they use identifiers, that there is used an standardised nomenclature<sup>9</sup>. Of course collect and convert to micro data a lot more data – for example building up the National Accounts Completely from firms, consumers, public sector digital traces. One indication is that there is no such plan, is that there is no plan for fading out the “paper”<sup>10</sup> surveys in their present form. All “hard facts” now collected – and a lot more can now with much more precision and detail and immediately. There will still be a certain need for surveys, to collect people’s opinions, those you cannot in most cases get from micro data.

## **Micro data and Big Brother Watching You**

As we all know - the attitudes in almost all social groups are divided – in many cases deeply inconsistent. The EU both want a common EU labour market, which demands that people are identified and taxed wherever they work in the EU. Most governments are trying to implement eGovernment services; which presupposes the widespread use of person identifiers etc. in public and private administrations. Every body likes micro data – and most people fear “Big Brother Watching You” society<sup>11</sup>, so what attitude should the one have to this “problem”. In my opinion it is necessary to start out with a two stylized facts to put such a discussion in its proper perspective.

First that despite the enormous amount of such data available to researchers, government agencies, private firms and various civil society organisations (political parties, sports clubs etc.) there have been no major scandals. Especially important is the experience from the Nordic countries; where such systems have the longest tradition. Secondly that there is no reason to believe that the police, the secret services of a country and their international allies

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<sup>9</sup> In semantic web jargon a nomenclature is often called an “ontology”.

<sup>10</sup> Most of these survey-data are collect using the web or computer aided interviewing.

<sup>11</sup> One, rather random example: <https://p10.secure.hostingprod.com/@spyblog.org.uk/ssl/spyblog/2011/01/15/census-2011-press-release-on-lockheed-martin---ons-still-pretending-that-they-wi.html>

will not get access to these digital traces disregarding how many laws are made against it. Partly because such laws mostly have loop holes like “for national security reasons”, but mainly because even in peaceful Norway we have a long and well-documented tradition of illegal surveillance of the left. In the last decade there is most probably illegal surveillance of various Islamic organisations and milieus.

As argued above there is no doubt that only using data from your mobile phone one can get to know a lot about a person. Member of the Green Party in Germany Malte Spitz had to file a suit against Deutsche Telecom to get his data which he wanted to use as evidence in the ongoing debate about the EU directive on storage of email and phone call data. As the article in Die Zeit Online sums it up:

“This profile reveals when Spitz walked down the street, when he took a train, when he was in an airplane. It shows where he was in the cities he visited. It shows when he worked and when he slept, when he could be reached by phone and when was unavailable. It shows when he preferred to talk on his phone and when he preferred to send a text message. It shows which beer gardens he liked to visit in his free time. All in all, it reveals an entire life.”<sup>12</sup>

If one added to a persons telecom trace all the other digital traces left behind in shops, cinemas, bars, fitness studio paying with his card; and adding his online booking of courts at the local tennis club etc. one can map an entire life in even greater detail.

Despite such “shocking” stories like Spitz’ it is in my opinion contra productive to try to limit the use of the digital traces we leave behind. In a socialist society we would clearly do so. I think the only way to limit the misuse of such data is to increase the social control over the use of such data. By that I do not mean parliamentary committees, although that is clearly better than not control at all. To have efficient control over the use of such data by the police, especially the secret police you have to have hands on control by those working with the files on a daily basis. That means that the staff handling such data in the secret police have to be elected by the parties represented in parliament, or civil society organisations with great credibility like the trade unions, human rights organisations etc. One might consider that all data should go to a “trusted third party” so that there was control of the type of data that the police and secret service did get access to on both a permanent and ad hoc basis. This could be the National Statistical Institutions. But one has to be aware of the fact that “Big Brother” do not need a huge database where “all the data” about us are stored. Since almost everything is accessible by the internet, and given that everybody uses the same or compatible identifiers, the registers you need can be accessed on an ad hoc basis. All the digital information in society is in fact one enormous *virtual* – meaning potential, meaning possible to use when need be – database.

## **Summary – conclusion**

The fact that we are leaving behind an unbelievable amount of digital traces opens quite new horizons for social science research in general – and Marxist research in particular, because the degree of detail, not the least in the dating of events really serves the dialectical, historical

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<sup>12</sup> See <http://www.zeit.de/digital/datenschutz/2011-03/data-protection-malte-spitz>

essence/appearance approach of Marxism. A lot of the traditional controversies would benefit from such data, allowing a Marxian process of Realabstraktion. To have detailed accounts of hours worked, wages received, education, what chocolate bar produced, sold where to whom opens up for better understanding of society and consequently better ability to change society to the better.

The very real fear that such extremely detailed data collected might be misused must not lead to a fight against the introduction of person identifiers and their use in every possible context, that is from the tax register to the local sports clubs membership register. What has to be done is to demand a radically increase in “workers control” by the workers actually employed for handling such data, be it in statistical offices, telecom companies or secret police computer centres. One can not love micro data as a social scientist and fight against them as a left wing political activist at the same time. That is not progressive and it does not make sense neither in the short run nor the long run, under socialism where one must use such data for rational planning.

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