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Classes

From National to Global Class Formation

Edited by Hardy Hanappi

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Meet the editor

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Contents

Preface

Stormy times are looming just around the corner during the next ten years. People all around the world are increasingly feeling that a major shake-up of our living conditions is in the air. The three most visible global dangers are an environmental collapse, a third world war, and an accelerating inequality of welfare between different parts of the human population. It is evident that these threatening developments are highly *interdependent* alarming symptoms of the same social process: the dynamics of global political economy. Large scale exploitation of nature causes severe environmental damage, exploitation of man by man causes class struggles, both lead to inequalities that induce massive migration flows. Inequalities enable authoritarian leaders representing the richer parts of the population to propagate the return to direct coercive power to secure relatively better-off welfare standards, i.e. to prepare internal and external war. The renaissance of racism is just a straightforward consequence of this downward spiral of human social progress.

The classical concept of *political economy* in principle captures two main aspects of the workings of a human society. First, the term "political" refers to the role of power exerted and institutionalized in a closely interconnected community. Groups within such a community form according to the positions and properties of their members, they become social classes. Physical power clearly played a decisive role in early societies. To enable some cooperative common welfare increase, class struggles in a community can freeze into temporarily stable institutional settings. Second, the term "economy" encapsulates the mechanisms that might emerge under the umbrella of an institutionalized political system. If direct coercive power is exorcised and transferred to institutions, then classes and individuals can act out their respective goals by encounters on equal footing, which are usually regulated by a law system. The "economic" description of what will happen in this case thus completes the characterisation of a given society.

Dynamics enter the argument as soon as a longer time horizon with changes from one relatively stable political regime to the next is considered. Then it is necessary to delineate the dynamic processes that slowly undermine the old institutionalised system until finally the revolutionary break sets in. Once this happens, a second dynamic starts, namely the desperate search for, indeed *the fight* for a new, hopefully stable constellation. It is only *dynamic political economy* that provides a full picture, and since we seem to live at the beginning of such a structural break, it is particularly important to study this second type of dynamic.

As a first step the drivers, the social entities behind the movements in society have to be determined. As history shows, during deep structural breaks these forces usually change: some old players loose power and start to vanish, eventually new players emerge. A finite set of possible new coalition constellations, of compromises, appears on the horizon. But

which one can be reached is an open question, a question of more or less fierce class struggle plus an element of randomness.

In a nutshell this raw description of social progress reveals the purpose of this book. It suggests that we are approaching a revolutionary change of the global political economy, and that we therefore are in acute need of a theory that explores our options for a surviving human species. To start with, the major social entities involved in this change have to be identified. Thus this book is about the formation of classes.

In everyday language the meaning of the word "class" has lost its innocence for a long time already. In this respect the central point is that it reminds on the national class struggles of the 19th century. Today, class is still understood in the context of the famous fight between the feudal class, the bourgeoisie, and the working class. The feudal class of the 19th century had set the political framework against which the other classes revolted – and revolted successfully. Since the end of World War I a new situation, a new global constellation was at work. Class structures clearly had changed and theories of political economy had - and still have - a hard time explaining Fascism or the Soviet Union with the help of adapted class concepts. Nevertheless, there is one issue that can be taken for granted: the concept of class has surpassed the national scope to which it was confined in earlier times. It now has to be understood and identified on a global level. The two major reasons for this reframing of the concept are that: (1) the human production system providing goods and services indeed is to its largest part already a globalised system, and (2) our communication and knowledge system, due to our information technologies, is already global too[1]. Hence the title of this book.

The theoretical effort to come up with a new framework to understand contemporary class formation based on empirical research goes far beyond the possibilities of this book. It needs years of common scholarly work of like-minded, transdisciplinary scientists. What this book intends to do is to spread the idea, and to provide examples for starting points of further investigations. In this respect a common entry point is the discovery of *pivotal contradictions*: as the old global social system loses its stability, several contradicting trajectories of important variables of political economy can be observed, e.g. rising unemployment rates cannot be stopped by a nation state that is forced by global creditors to reduce public employment. Or, large less-educated populations that are not representing effective demand are growing and are migrating, while enormous amounts of cash are desperately looking for profitable investment - and are not able to stop the misery of migration. Contradictions like these call for the emergence of new social entities supported by newly defined classes or class coalitions. The chapters in this book try to discover important contradictions, since they are the source of newly emerging social entities.

It goes without saying that new classes and social entities are not necessarily benevolent supporters of human progress, e.g. Fascism or international terrorism. From a long-run biological point of view it also cannot be expected that the progress of the human species will continue forever. To be extinct as a species has turned into a realistic scenario in the last eighty years. Today survival needs an outstanding and concerted effort, both theoretically and with respect to political groundwork – and it certainly needs some luck too.

The thoughts presented in this book hopefully look fresh and exciting. But, of course, they are owed not only to our own intensive life-long investigations, they sometimes have been stolen and transformed from a very large number of colleagues and students in endless conversations – consciously and unconsciously. So it is useless to express our gratitude explicit-

1 Another, subtler difference to the national context is the fact that the inequality between cultures on a global level, e.g. how far they already have emancipated from religion-driven tribes, concerns many more dimensions of inequality than inequality within a nation.

ly to single personalities. Thank you all. We hope that our own ideas appear to be precious enough to be stolen too.

The only explicit appreciation has to go to the InTech publishing team, in particular to Ms. Lada Bozic. It was her never ending long-run patience paired with still optimistic short-run impatience that made this book possible. I hope that the impact on readers can compensate all of us for the burdens of production.

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Chapter 1

Introductory Chapter: Classes - From National to Global Class Formation

Hardy Hanappi

Additional information is available at the end of the chapter

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1. Introduction

This book is meant to start a grand debate on the investigation into the forms of global organization of the different large groups on earth, or to use the traditional concept of political economy, an investigation into a possible future global class structure[1]. It is evident that what holds the human species together is its genetic setup; it makes each individual member an element of the species. On the other hand, it is far less clear in which way the structuring of groups within the species evolves. Of course, the continuing growth of the number of individuals increases the impact on the environment of the species as well as on its internal structure necessary to maintain its flourishing. As history shows, this evolution comes in the form of alternating stages: long periods of relatively smooth growth with only slightly changing structure intermitted by much shorter periods during which the old structure is broken up, new organization forms, and social entities emerge, while some others are eliminated[2]. The focus of political economy is to understand this highly complicated nonlinear dynamic process, needless to say that a formal treatment is out of sight as long as even a preliminary canonized understanding of its major ingredients in prose is not available.

The task here therefore is more modest. It is just one step in the long-run evolutionary process of human progress that is considered: the step from nation states and their internal class structure to the emergence of possible global classes. This introduction will present some general ideas on how the growth of the sheer size of political entities—governance of countries, of continents, and of the whole earth—interacts with the traditional class concepts and enforces their theoretical adaption.

[1] The diachronic narrative presented here differs sharply from the synchronic panorama of current uses of the concept of a class, e.g., in [1]. While both approaches are of complementary value, the one presented here makes it easier to broaden the class concept for a better understanding of contemporary class struggles.
[2] Compare [2].

2. The primacy of the group

The human species, like all forms of living systems, starts as a biological entity, i.e., with the property that single members die faster than the species. It is the organization of self-reproduction and inheritance that is the characteristic feature defining a group and the way in which physical material and its interaction are bound together and are organized, defining a certain species[3].

The qualitative step leading to the evolution of the human species has been the emergence of a sophisticated type of group consciousness. Its forerunner in the animal kingdom evidently was based on kinship relations, on families. If a group member dies, it should already have transmitted its traits to the next generation to maintain the species. For the lower forms of biological species, the consciousness of their species is encapsulated in the distribution of traits that its individual members exhibit. As John Maynard Smith showed with the help of game-theoretic reasoning[4], the same species might well consist of different groups that are determined by the environmental conditions. For animals it cannot be assumed that a member of such a group *knows* that there would be the option to become a member of another group. It is only the interaction with its environment, with "nature," which selects the distribution of traits by extinction of the unfit, thus leaving more room for the survivors. Note that for the single unconscious member of a group, also the interaction with the member of another group within the same species appears as an encounter with "nature." All consciousness of an animal species therefore is hardwired in its overall distribution of characteristic traits. With the emergence of the human species, the software of internal model building of its members enters the scene. Now the knowledge of the parents can be transferred to the next generation by passing on these internal models. Learning of the species is no more restricted to the extinction of the unfit by "nature," but some lethal mistakes of members can be avoided by the use of internal models stored in an explicit collective memory. Under these new circumstances, the concept of the *family* assumes a new role. In a family now, socialization of children takes place by the conscious transfer of behavioral rules. Complementary to the inherited genetic setup—and for the largest part replacing its influence—socialization during the first years of life within the local environment of the family sets a basic frame for the internal models of individuals, till today. Socialization thus dominates the inheritance of genes, and since it is family business, this means that the group behavior of a family already dominates individual behavior. This is the first instance of what I call the *primacy of the group*.

The next larger local environment that was covered by shared internal models concerned the dispersed activities of groups of families, call them *tribes*. In a tribe some division of labor accompanies the split of activities into those that are beneficial for the whole tribe and those that only help the single family[5]. This development is the root cause for all considerations of political economy. The success of a tribe by and large was its ability to shape its environment

[3] Note that the title of Darwin's path-breaking book *On the Origin of Species …* [3] refers to the sequence of internal links between species. It presupposes thus the self-reproducing capacity of a species and aims at the meta-level of biological progress.
[4] See Ref. [4].
[5] In the economic literature, the term family often is replaced by the statistically more appropriate term household.

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in a way that allows for maintenance and even growth of the number of families. To promote such success, the regulatory framework of the tribe usually prescribed rather rigid behavioral rules for its members. In this ruleset, the knowledge of the tribe manifested itself. This knowledge became the core characteristic of the tribe; it can be called the *culture of the tribe*. Again, the culture of the tribe preexists when new members of families are born. Their lifelong socialization process to a large extent remains embedded in this culture. The primacy of the group, of the culture of the tribe, cannot be denied.

A newborn baby can be described along two perspectives: From the perspective of the human species, it is subject to a grand lottery. It is completely arbitrary in which groups and with which family its existence starts. From the perspective of the baby itself, these circumstances—once the wheel of fortune has stopped—are totally exogenously given facts. Its further development starts with rulesets of a family in a specific tribe, and emancipation from this framework, the breakup of traditional behavior, is only possible if it is already disposed in the respective framework. The size of the room to escape from predetermined structure thus is itself subject to the long-run evolution of societies. At different times, individuals as members of families and tribes can exploit this room, and if a society manages to enlarge it, then exceptional outcomes are possible. What then correctly appears as the achievement of an individual still is bound to the emancipatory status of the society it came from. To understand why the emancipatory process of cultures sets in in the first place, of course, needs some further explanation.

The general and immediately obvious reason is that any growth process in a finite world will hit limits that produce contradictions. An observed state of affairs that is relevant for a tribe is a contradiction if it cannot be understood with the knowledge of the tribe[6]. Two types of contradictions have to be highlighted:

The *first contradiction* occurs if the growing territory of different tribes starts to overlap. In this case tribes start to build a special group of particularly strong specialists, of fighters, to conquer and to defend territory. The *second contradiction* is closely related to the first one but concerns the internal organization of the tribe. As the group of warriors is selected by strength, there is no reason not to apply this strength also inside the tribe. Since warriors risk their life in combat, it seems to be justified that the rest of the tribe compensates them for this service of higher security by providing their economic welfare. Politics, to exert coercive power, and economics, to produce food and tools for production, start to be reflected in the emergence of different groups in society. In times of peace, the amount of support for warlords coming from the population can be regulated by the former, quite generally the classical political division of society into a reigning nobility, and ordinary families become a permanent property. These are the two originally opposing classes envisaged by classical political economy, a ruling class and the rest of the population.

Since the source of the political power of the ruling class is its capacity to apply power, it consists of two factions, which specialize in the two ways in which power can be applied: Power can either be (1) direct coercive, physical power or (2) ideological power, i.e., consists

[6] It is important to distinguish understanding from handling. Missing understanding can, and did, nevertheless result in a specific handling of observed phenomena, mostly in the form of religious beliefs in a superior being, typically maintained and exploited by a group of priests.

of the manipulation of the internal models used by the opposing class[7]. From the classical slaveholder empires of Athens and Rome till the Middle Ages[8], these two factions of the ruling class are a historical constant. They usually share and cooperate in the exertion of power, one faction is governing the "worldly ruleset,' and the other governs the "religious ruleset."

The divided tribe, as a mixture of what could be called groups, developed into a society divided into two large and opposing forces that now better are called classes. They are forces, since it needs permanent power for the ruling class to dominate the ruled class, and this oppression provokes resistance, i.e., a counterforce that in historical revolutionary episodes leads to a deeper restructuring of the power relations between classes, even to the emergence of some and vanishing of other classes.

It is also remarkable that these early societies were economically almost exclusively agricultural societies—though trade rapidly increased in importance—and that the political class structure therefore implied a dominance of farming activities in the exploited, the productive part of the population. Class status therefore typically could be derived from the position in the production process; the political class structure was congruent to the economic class structure. The theoretical concept of political economy is based on the historical emergence of these two interwoven aspects.

The newborn child thus also is thrown into the socialization process of a certain class[9]. The primacy of the class is felt as soon as the young adult looks for the possibilities of economic activities, but even earlier her or his class status is at least implicitly communicated within the family. One of the pivotal, though often ignored, achievements of the bourgeois revolution was to institutionalize a somewhat more permeable borderline between classes.

3. Nations and class formation

The most important contradiction in late feudalist regimes probably was the impossibility to secure the finance of their oppressive forces. The reconstruction of trade links after the dark Middle Ages had led to the emergence of rich trading families that were not part of the nobility. But to give away its political supremacy was not imaginable for the feudal class; different forms of compromise proved to be of little help[10]. With the French Revolution of 1789, the bourgeoisie, in official political term the Third Estate, could overthrow Louis XVI. Till 1814, till the restoration of the Bourbons, this radical change in the political power structure was spread over all of Europe by Napoleon Bonaparte. The seeds of a possible emancipation of lower classes were not

[7] Compare ([5], pp. 36–40) for a simple formal description of these two forms of power.
[8] A seminal work underpinning this point came from the French historian Georges Duby [6, 7].
[9] The mind-set of the ruling class of the nineteenth century is excellently portrait by Thorstein Veblen [8].
[10] One of the most successful compromises occurred in Britain, where high nobility could arrange a coalition with international trading companies against the interests of lower nobility. Of course, the possibility of this arrangement, to participate in the merits of early merchant capitalism, was only available for the global hegemon of the era. It is remarkable that already in this early stage of enlightened absolutism in England, a certain space for intellectual mavericks became visible. Together with the need to advance technology for manufacturing, it enabled the boost of the industrial revolution. The nucleus of a class of entrepreneurs was born.

only well received in some intellectual circles; the idea to take education out of the hands of the church, the main ideological institution of feudalism, became a popular demand[11].

A new social agent, the republican state, entered the political scene. Its advent in the form of the nation state marks the most important turn in human history. The young republic emancipated itself from being the state of one dominating noble family, e.g., the Bourbons. But whom should this abstract social agent represent? And how? As history showed, the first best guess was a military leader, who in the beginning subscribed to abstract revolutionary goals, Napoleon Bonaparte. He quickly resorted to the old feudal forms of reassuring his power, i.e., to war against outside enemies. And he failed dramatically; after a second try to overcome feudalism in 1848—again a failure—it took 70 more years till the bourgeois revolution finally succeeded in 1918. These years of a troublesome birth process of a bourgeois society, from 1789 onwards, are the years when the idea of the nation as a political entity that unites different tribes and classes along the lines of a common culture took hold.

The birth of the nation state therefore was linked to the emancipation of society from feudalism. This was its progressive element[12]. But the change of the internal class structure of a nation state was a far more ambivalent and complicated process than the simple abolishment of the political dominance of the nobility would have suggested. Nations in the nineteenth century mostly were built following military aspirations, be it on a more progressive track like Italy under General Garibaldi or be it on a conservative track like the German princedoms under the Prussian lead. The economic structure of the territories experienced a differentiation due to industrialization. The economically determined class structure followed this trend—experiencing a split-up of the lower class into working class, farmers, and bourgeoisie—but the split was ideologically varnished by nationalist propaganda, which already antedated the upcoming cry for national unity that was the hallmark of policy in World War 1.

For many scholars of political economy living in the nineteenth century, e.g., Karl Marx, the possible detachment of a class' consciousness from its true role in political economy was the starting point of their analysis. If only the working class could be given its appropriate internal model, i.e., its consciousness to be the exploited class, then the necessary next structural break, the revolution, would happen. In that sense the Marxian practice was just a prolongation of the strategy of the French Enlightenment. But Marx and his followers underestimated the strength of the ideological battalions that the ruling class together with the frightened parts of the bourgeoisie could bring on the table. With some slight improvements of working conditions combined with an increasing nationalist propaganda, not only the British working class could be silenced. The question of class consciousness could be reduced to a national agenda that in a nationally institutionalized way could act as a thermostat responding to the heat of class struggles.

The nation state, already only too visible as a feudal state toward the end of the nineteenth century, became the dominant political arena of the era of integrated capitalism in

[11] How important oppression by ideological power was could be seen later, during the Paris Commune in 1871, when the rage of the population against all forms of religion was dominating all other targets of the protest.
[12] This also explains why nationalism in the colonies of already bourgeois colonial powers, e.g., in Cuba, could play a progressive role. The link between the empire and its colonies was still a feudal type of relation.

the twentieth century. It is interesting that even earlier it was the state that initiated the (modern) concept of the nation, and not vice versa. As the historian Eric Hobsbawm proves, nationalism is a comparatively new concept, emerging only in the last decades of the nineteenth century ([9], pp. 14–45). It is the state which also transforms the inner class structure of feudal kingdoms and starts to exploit the vague notion of a nation. Classes appear in these late feudal states as the four estates: nobility, clergy, bourgeois, and workers. For enlightened absolutism political command had to rest in the hands of the first two states, while for economic support some agreements with the third estate became necessary. The fourth estate should remain politically invisible and under the fractioned control of the third estate. This classical division of a state in four estates implied a further split of functions in the ruling class. It followed the political and economic functions that had to be served. The first two functions, both concerning political leadership, were divided according to the two forms of power to exert. These were the roles for nobility and clergy. The economic part, organizing and improving the extraction of social value from nature and workers, was assigned to the bourgeois. Since the members of this class now not only had to play an explicit role vis-à-vis the workers but also had to be tamed as members of the state, the bourgeois assumed his second interface "citoyen," as citizen. As long as this structure remained valid—that is till the end of World War 1—there was practically no political role for the working population. Remember that the (still mainly agricultural) economic activities included farmers as well as the emerging industrial proletariat. The hope of the diverse communist and socialist labor movements of the nineteenth century was that a revolution would sweep away the first two classes and would then lead to a democratization of political leadership under the lead of the economically productive class—the workers.

The concept of democratization quickly proved to be very complicated. The experiences of Paris in 1789 and 1871 had shown an additional dimension of contradictions: The population of large cities, of the polis, lives in a very different environment than that in the open land. It usually is better informed and ready to take action; it is on the other hand often more exposed to the threat of a famine and can eventually be cut off from what it needs from outside the city. The already existing necessary political organization in a big city makes its citizens usually more aware of collective organization—and therefore a larger potential option for further progressive advance can be assumed. Feudal regimes typically played their political games on this contradiction, e.g., by using troops from the French countryside to reconquer Paris. Since in the meantime the majority of the world's population lives in big cities, this contradiction plays an enormous role in todays' global class structure[13].

After World War 1, participation in political power of the existing economically determined classes—now excluding nobility—had to be cast in institutionalized mechanisms. In Russia the success of the Bolshevik revolution to a considerable part could be attributed to Lenin's skill in building a coalition between the small industrial proletariat and the big group working in agriculture. As a rule, the art of coalition building becomes mandatory in politically turbulent times. The radical change in state power from the ultraconservative Tsarist regime

[13] An immediately necessary refinement has to be added: The megacities of today fall into two completely different categories, namely, those in rich countries and those in poor countries; see also [10].

to a new institutional setup made room for a new type of agent: the communist party[14]. In European countries, the regime change was softer. The two winning classes, workers and the bourgeoisie, did stick to the idea that the Republican state is the next step toward democracy. It is this state that distributes economic and political power, and influence on its decision can be exerted by political parties. Class structure thus was expressed as the relative power of political parties measured by votes in elections. Therefore, in most countries two strong parties, representing the two classes, were establishing themselves in the early 1920s. It was the constitution of the state, i.e., written supreme law, which determined how class interaction has to take place. In a lower level of the law-setting process, this supreme law also determined in which ways the lower level could modify interaction rules. Both classes inserted their class-determining essentials more or less explicitly into the constitution: Workers are not slaves, there exists a catalog of essentials called human rights, and the private property of the means of production is sheltered by the state.

This political upgrading of state mechanisms coincided with the need to fix the state structure of Europe after Germany had lost the war, and WW1 had set an end to Austria-Hungary and the Osman Empire. What could be considered to be a proper state followed the new ethnolingual dimensions of the concept of a nation. The nation state in this modern meaning only had occurred around 1874[15], when in Germany and in France its leaders discovered its ideological force. Despite its role played in determining the new map of Europe, the concept of a nation when compared to the actual diversity found in each "nation state" remained vague.

It probably was one of the major clues for the Fascists' success that they (mostly unconsciously) discovered that vague concepts can be an extraordinary ideological weapon. While other parties were looking for complicated answers to complicated questions, the fascist movement at best did hint at the shortcomings of others and apart of that invented an unreal cult of supreme nation and supreme race. Their movement therefore completely escaped the categorical apparatus of the two main classes and their parties. Members of the fascist movement were not characterized by belonging to a certain position in the production process. They came from everywhere. The only necessary condition was that they could be impressed by the fascist ideological offer: fascist social identity. While the old parties in principle still did refer to the important economic function of their class and therefore tried to "enlighten" the general public to vote for their cause, the fascist movement simply tried to turn the (economic) light off and set a spotlight on race and ethnicity. The main lesson to be learned of the interwar period thus is that the strength of ideological warfare relative to old-style institutionalized class struggle in modern states can explode. The tremendous impact of Fascism in the twentieth century justifies—even necessitates—to broaden the class concept. If the scientific goal is to understand the major social agents that shape social dynamics, one of these agents has been Fascism. Agents are formed by power structures binding groups into classes. If Fascism was able to use ideological power (without much reference to economic status) to create such

[14] At the latest after Lenin's death in 1924, the missing tradition of progressive discourse as a counterweight to decisive and quick decision-making (a necessity during Tsarist oppression) let the young Soviet Union slide into an authoritarian one-party regime. Its class structure fell apart into a ruling class, i.e., the party elite, and the common citizens. Toward the end of the twentieth century, a third class should be added: the oligarchs.

[15] See Ref. [9].

a strong movement, then it is justified to talk of a fascist class. Of course, history also showed that once in state power, the fascist class has to fall back on dictatorship and the mechanics of an authoritarian command economy. The missing relationship to an actual role in political economy then has its price—Fascism in state power is aggressive and costly, but short-lived. That does not mean that national racism is short-lived in the minds of its members. The basic interpretation scheme it provided to explain what happens in the world is a durable intervention in the internal model-building process of potential fascists; it is ideological micropolitics. If one accepts the broadening of the class concept, then the fascist class is a still existing, globally dispersed underground force.

Broadcasting, more generally technological advance in communication techniques, was a major catalyst for fascist movements. This throws a light on the role played by technology in class formation processes. The larger the audience that can be reached, the more volatile and fragile the control by reality check becomes, by testing an issue with empirical experiments, in particular if the communicator hides the message behind emotionally loaded but vaguely defined words. Welcome to the twenty-first century.

4. Global class formation

Technological advance took giant steps forward in the last four decades. We now have an incredible amount of the knowledge of the human species literally at our fingertips; this is the "I" (information) in the abbreviation "ICT." Additionally, and to be distinguished from the former, we can communicate—the "C" (communication) in the abbreviation—via smartphones instantly in person-to-person calls around the globe. The "T" (technology) in ICT has taken us to a different level of possibilities for the human species. At least our characteristic property—building and exchanging the internal models we used to interpret our surroundings and to choose our actions—now could be developed on a technological backbone unimaginable only 150 years ago.

The timid beginnings of the first wave of globalization in the production sphere just before WW1 under the hegemony of Great Britain had been interrupted by WW2 only to be continued under the hegemony of the USA after 1945. Today production activity is already a highly interwoven global network. The remaining short and closed production-consumption circles that still exist are embedded (and of little impact) in the grand dynamics of global business and politics. It is hard to imagine that the fruits of the global division of labor manifested in the globalization of production processes can be radically reversed. But what can happen is a temporary backlash by a third World War, which today evidently also includes the risk of an extinction of the human species. As the twentieth century, experience showed the danger comes from a dynamic in class formation that is driven by ideological warfare[16]. To understand the workings of this type of dynamic processes, a kind of "social cancer," it is necessary to study empirically a rather wide set of conditions, which allow its emergence and can speed up its growth.

[16] In [11] the two ideologically opposed attitudes toward the future global development are exposed as "Humanism or Racism." A "Pilot Project Europe" is proposed that could be used as a template for global politics supporting humanism.

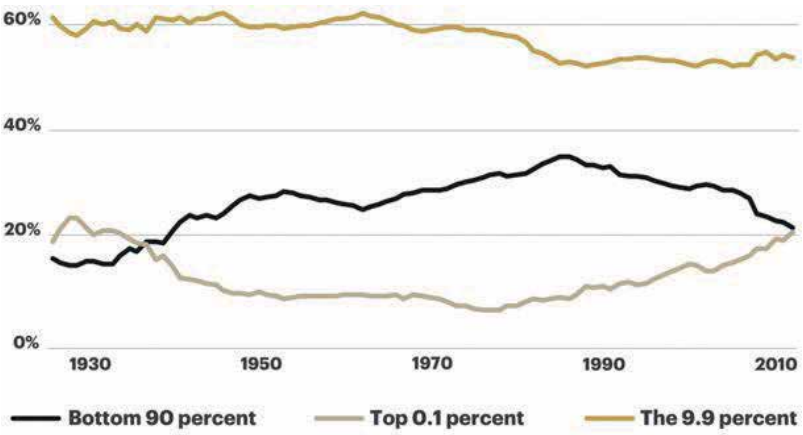

Figure 1. Three groups of wealth in the USA. Source: [12] Using data produced by [13].

In the national settings considered in part 3, it was the nation state that could set the political stage for nationally admitted agents and sublimated class struggle—at least it attempted to stay in power until fascist movements took over. For the global dynamics of today, no such arbiter of last resort exists; there is no global governance yet. The elastic adhesive agent that keeps the diverging forces together is *global capital*, which hides behind the misnomer *financial markets*. The essence of this rather new and truly global agent is that it determines on the most general level what social value is and how it is produced, distributed, and consumed. It does not need to be globalized, it already is. It enters the internal models of individuals as an invisible but almighty force; only data perceived on international stock exchanges allows to perceive the moves of the monster. When Rudolf Hilferding at the beginning of the twentieth century tried to update Marx' concept of capital by writing his influential book *Das Finanzkapital*,[17] he barely could know to which wonders this latest transformation of the species character of social value will lead.

The "character masks" of capital—this is the term used by Marx to avoid a too personal touch when he writes about executors of the capitalist algorithm[18]—are just a tiny share of the ruling class now. A look at the recent increase of power (measured as the share in wealth) of this group in capitalism's home base, the USA, shows that it is leaving the still well-off citizens (the "9.9 percent") behind; compare **Figure 1**. Mathew Steward nicely explains how this development in economic wealth influences socialization and cultural habits of these three distinct groups in the US society.

It would be misleading to introduce the term "middle class" for those still well-paid US households. Such a classification still sticks to a linear view of a bipolar class concept that spans between proletariat and capitalist class and allows for a gray zone in the middle. As argued elsewhere—and contrary to Tony Blair's exclamation "we are all middle class now"—any consistent theoretical concept of social value necessarily provides a sharp border between

[17] See Ref. [15].
[18] Compare [16] for a definition of the *capitalist algorithm*.

exploiters and exploited. There is no middle class. The complications with the class concept are the result of the interplay between superstructure and economic base of the insufficient analysis of the wars on the ideological battlefield.

The local perceptions mixed with global interference from capitalistically driven mass media produce a strange brew of tribal communities. As Zak Cope vividly argues, a "labor aristocracy" in rich countries has to be distinguished from the proletariat distributed all over the third world; see Ref. [14]. Moreover, those living in the megacities of the third world face radically different conditions than those in the open land. A similar distinction holds for rich countries—and for China. For both distinct cases and across all four cases, migration flows occur and probably will be amplified by global climate change.

An economically induced split in the global working class also came about: To sell products there must exist what Keynes called "effective demand," i.e., families with enough money to buy. This cannot be the workers whose low wages have enabled exploitation, and the ever smaller group of superrich buying extraordinary expensive goods and services cannot compensate for the super poor. The solution is a credit system. Europe, the continent with the largest consumption, is a model case. The faction of the ruling class, which governs capitalist European nation states, can let government debt increase to help firm owners to sell. This can either be done by tax reductions, military and other state expenditure, or similar actions. The money borrowed by the state induces interest payments to creditors, and the security offered by the state faction of the ruling class to its firm owners' faction is simply its monopoly of power. It can always raise taxes or reduce social transfers. From time to time, in particular after heavy financial crisis (see **Figure 2a** and **b**), the business faction wants to see that this state power is executed to feel sure that the security is there; this is the background of the so-called austerity policy. Nevertheless, in more quiet times, layers of different income levels in the global economy make sense for a smooth development of integrated capitalism. They undermine international working class formation and help to maintain effective demand. With this policy naturally comes a balanced increase[19] in government debt mirroring also the growth of importance of public goods necessitated by stronger global economic interdependence.

Figure 2a shows that there still is a substantial difference between average wage in the USA and in Europe, though it has to be taken into account that inequality in the USA is so much higher that low wages often even are lower than European low wages. A more revealing comparison of these wage layers with those prevailing on other continents goes beyond the scope of this introduction.

In **Figure 2b** three parts of Europe are compared to show how strong economic layers are suggesting special economic policy measures. In EU North a similar, though somewhat weaker development than in the USA, can be observed. The demand stimulus in the USA could be stronger since it provides the globally used currency, the US dollar. The Euro has helped to imitate US policy but was applied only late and with hesitations. Nevertheless, it helped a somewhat retarded increase of effective demand in Northern Europe. This demand

[19] For the ruling class, there is a trade-off between the stimulus for demand and the danger to loose private profit. It is reflected as a conflict between the faction of firm owners and the faction of administrative stability providers, i.e., political rulers.

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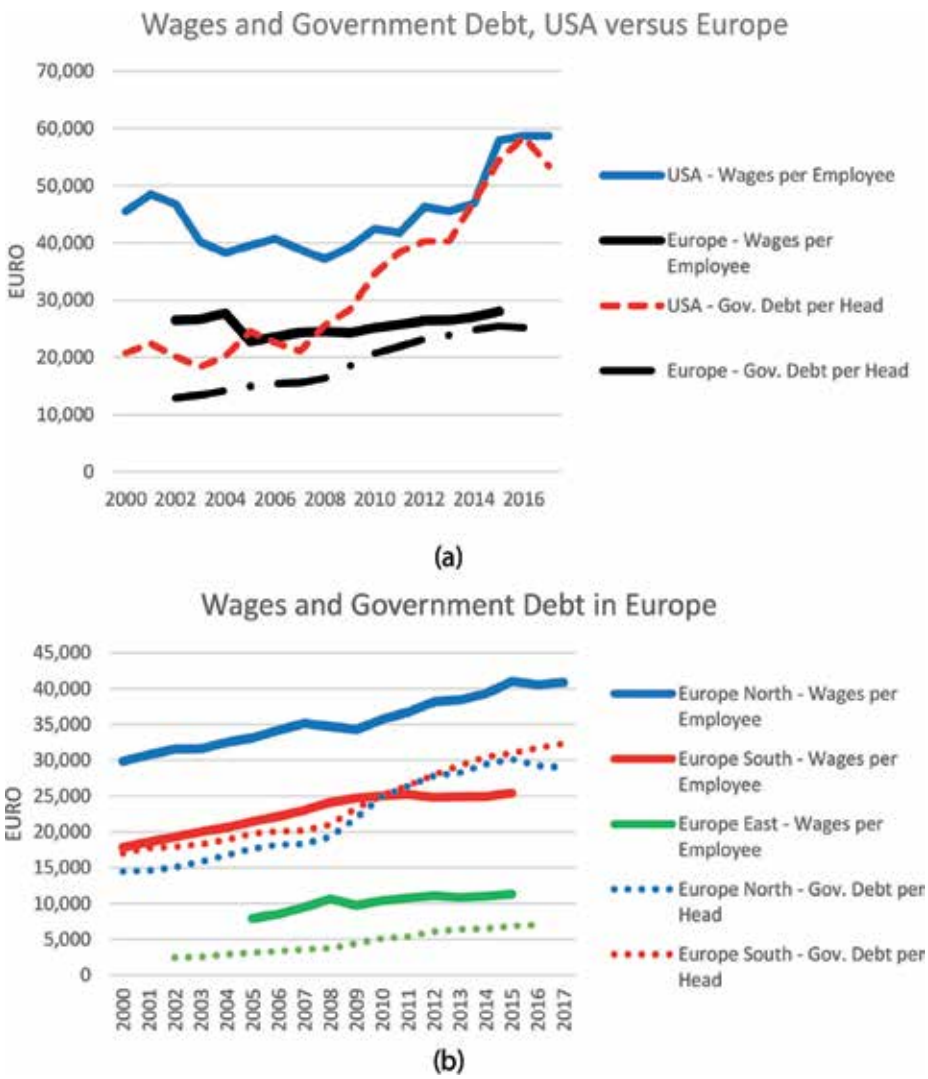

Figure 2. (a) Two global wage layers and their connection to government debt. (b) Wage layers in the three parts of Europe. Source: AMECO database, European Union.

unfortunately had been partly made possible by financial transfers from Europe's south including the closedown of affiliates of Northern transnational corporations in the south, raising debt and unemployment there. This depressed the southern average wage, which anyway was already far below the northern standard. The remarkably low debt level in Eastern European countries signals the missing trust in their governance competence. The corresponding low wage development relative to the other two parts of Europe points at a stagnating—or even widening—wage structure.

To take a look at Europe from such a more structured perspective does not imply that a "Europe of two speeds" should be supported. Each of the three parts emerged out of its

particular historical role in the last century, and there is no single arrow of time that assigns the place of a role model for one of these parts. There is no best practice of capitalist management; different contradictions broke up in different ways in different parts of Europe.

What unites each part is only a similarity in their basic national class structure. For example, for Eastern European countries, the common past as socialist satellites of the Soviet Union and the transition mechanisms toward EU and NATO membership have produced some shared class structure similarities. Europe's Mediterranean countries typically share a better safety net of family ties, village communities, and some informal tolerance when it comes to financial constraints. Only this sloppiness paired with deeply rooted humanism enabled them to accept the deterioration of wages and employment. Europe's North excels at diligence and trustworthiness, an important feature to succeed in the world economy, but it also often misses flexibility and creativity needed to master new challenges. The art to combine the European diversity might be a pilot project for global diversity. The minimal toolbox to start with should contain (1) the acknowledgement of social classes as major agents in decision-making processes, (2) a sophisticated voting system that assigns mechanisms to well-specified groups of decisions[20], and (3) an independent public media sphere guided by a class devoted to progressive scientific knowledge. In the moment, the process got stuck at square one, though mathematical groundwork in voting theory already waits for application in field two.

Again, the layers of the proletariat thus emerging as an economic consequence enter the sphere of consciousness, e.g., as available family budget. With global comparisons (with the help of ICT) now much easier available for each family, a need for interpretative models emerges, models which explain why these income layers are there. This is the point of access for local and national political entrepreneurs to step in. Emancipatory revolts, like at the beginning of the Arab Spring, as well as revolutions and waves of migration can be set in motion. A broadened theoretical concept of class dynamics is needed—and has to be filled in each case with empirical data—to better understand what is going on.

Information and communication technology, tight global production networks, and a new money form have created an environment in which a broadened concept of class has to be established. Since the historical mission of industrial capital to increase labor productivity has been achieved and commodities for basic needs can be produced with less and less labor time by less and less workers, this implies that the economically determined power structures have shifted: With the dominance of global value chains, simple work now sits at the leaves of a production chain usually located and isolated in a third world country. Profits of transnational corporations stem to the largest part from exchange rate exploitation, which also allows them to sell the produced commodities to different layers of workers doing more complicated tasks, which are located in richer countries. The split-up of the economically determined working class not only has a geographical dimension implying that due to cultural differences the power of the class is reduced. It also changes the internal model-building algorithms of members of the upper layers of workers. For them working class consciousness can be replaced by the fear to slide down the hill to a lower layer—and ideological warfare of the ruling class will

[20] Note that a simple majority becomes obsolete if productivity has increased to a level where 60% can live from the exploitation of 40%. Numbers can be further twisted if a small group of controllers and manipulators with the help of ICT can influence internal model building of voters.

do its best to further such mind manipulation. It is interesting that this kind of manipulation simultaneously works in the opposite direction too: Instead of class consciousness, the hope to advance in the next higher layer of the working class is stirred. As an individual isolated between fear and hope, the worker loses its class relation; what remains is impotence.

The void produced, the loss of social identity[21] (previously derived from the position in the production process), provides room for many kinds of social identity surrogates. The classical, most dangerous example is the national racism that currently is surging again. A new fascist class using a less historically contaminated vocabulary seems to be at the doors in Europe and the USA. Another possible surrogate is a return to radical religious belief. The rise of the Islamic State is here the outstanding example, though less aggressive religious states, in particular in the Islamic world, have predated this development. The international dimension of this phenomenon probably allows one to talk of the emergence of an Islamic class. It is evident that the emergence of classes like these is a possible—almost necessary—consequence of global integrated capitalism. It can be expected that this century will see more like that.

But more humanitarian and progressive substitutes for economically determined class consciousness can be listed also. First of all, the class of feminists from its very beginnings has insisted to depart from a simple biological characterization by sex and to emphasize the social characteristic of gender. Its influence on today's global class dynamics via the internal model building of its members cannot be denied. Another class has substantiated the common concern about environmental disasters caused by capitalist growth: the class of environmentalists, also known as the green movement. Finally, the third large and globally dispersed group to be mentioned is the group with higher education, scientists and intellectuals[22].

For the globally ruling class, the new conditions of the twenty-first century also imply important modifications. The group of the wealthiest families became smaller, much more wealthy, and somewhat less concentrated in the USA. The class now is split along its lines of action: pure ownership, management of assets, political leadership (including administration and military), and ideological leadership (including mass media and ICT). In a sense, the first two factions waiting to be taken over by the "demos" are waiting for democratization. Their inadequate concentration in the hands of a few families appears as global inequality in income and wealth, in living conditions. To exert power in its two abovementioned forms (physical and informational) is the task of the other two factions of the ruling class. The more authoritarian the setup of these two factions in specific states, the less cooperation between these states can be expected. Therefore, globalization either undermines authoritarian regimes, or authoritarian regimes drive back globalization in the hope to become *the only authoritarian regime* governing the world, e.g., Turkey for case 1 and the USA for case 2.

This more complicated global class structure of the twenty-first century has barely been consistently investigated. Using the economically determined class concept of industrial capitalism, i.e., the time before World War 1, is insufficient and inadequate[23]. In today's ICT environment,

[21] Compare [17].
[22] In [18] this class is described in more detail. It is named *global class of organic intellectuals*.
[23] Our own attempt to apply the classical concept to the new situation was made more than 20 years ago; see Ref. [19].

the superstructure processes influencing consciousness, widening the gap between the isolated local individual and its simultaneously pretended global participation, are taking over the main role in the global power play. They have created conditions that make an update of the classical concept of class highly necessary. Individuals experience overlapping class memberships in an alienated local spot supplemented by pretended global citizenship on a screen. At the same time, the formation of new types of more global classes, humanist as well as racist, is on its way. Globalization has only just started; it will need democratization to be fully achieved. And to master this glorious task, successful and informed class struggle will be unavoidable.

5. The scope of this book

Despite its urgency the topic of this book did not provoke a canonical, generally accepted view yet. Of course, there has been a lot of empirical field work done by sociologists and anthropologists. There also have been numerous attempts to recast global political evolution in a theoretical framework by all major headquarters of political movements, and at least implicitly this always meant to take class dynamics into account. Perhaps the least fruitful research in the area came from economics, which due to its methodological backwardness—it still is under the spell of methodological individualism—stays firmly closed up in its ivory tower of surrogate mechanics paradigms.

The goal of this book thus is not to present a selection of consistent cornerstones of an already existing perspective on class formation. The best that could be done was to collect additional valuable pieces of a mosaic that currently is developing in this newly explored area of research.

Each of the presented chapters touches on one of the ideas that have been discussed in this introduction. This includes issues seemingly as far away of each other as finance, terrorism, inequality in education, and income. To some extent, it stays nevertheless up to the reader to discover connections and make up her or his own mind. In any case this burdensome intellectual effort will be rewarded by the feeling that one of the most relevant aspects of the evolution of our species has been better understood.

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Chapter 2

Rising Inequalities and Reconstruction of Labour Capital Compromises

Pascal Petit

Additional information is available at the end of the chapter

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Abstract

The so-called golden years of capitalism took place under the auspices of a broad political consensus that labour should be protected and benefit from economic growth. This compromise eroded in the 1980s and 1990s as shown by the rise in income inequalities and in unemployment. At the turn of the century, it became clear that the sustainability of the global economy was at stake. It is useful in this perspective to assess, as this chapter attempts to do, both the conditions in which the old compromise of the welfare states collapsed and how then the discussions on the sustainable development goals can be implemented and play the role of a new capital labour compromise at world level.

Keywords: income inequalities, capital labour compromise, financialization, sustainable development goals

1. Rising inequalities as a major trait of all contemporary societies

Developed economies have observed at the turn of the 1990s a rise in income inequalities. It seemed at first sight to be logically linked with an increasing internationalization of these economies. The competition of low-paid workers has indeed put a strong pressure on the wage of blue workers in these developed economies. Moreover this trend did not seem to decline as it should have, after a time of adjustment. Meanwhile the internationalization of the developing economies, which has effectively helped to reduce extreme poverty, has also been in most cases accompanied with growing income inequalities. By the beginning of the twenty-first century, the rise in inequality within countries had become a common phenomenon all around the globe. The demise of the communist alternative at the turn of the 1990s in both Russia (with the fall of the Berlin wall in 1990) and in China with the economic reform

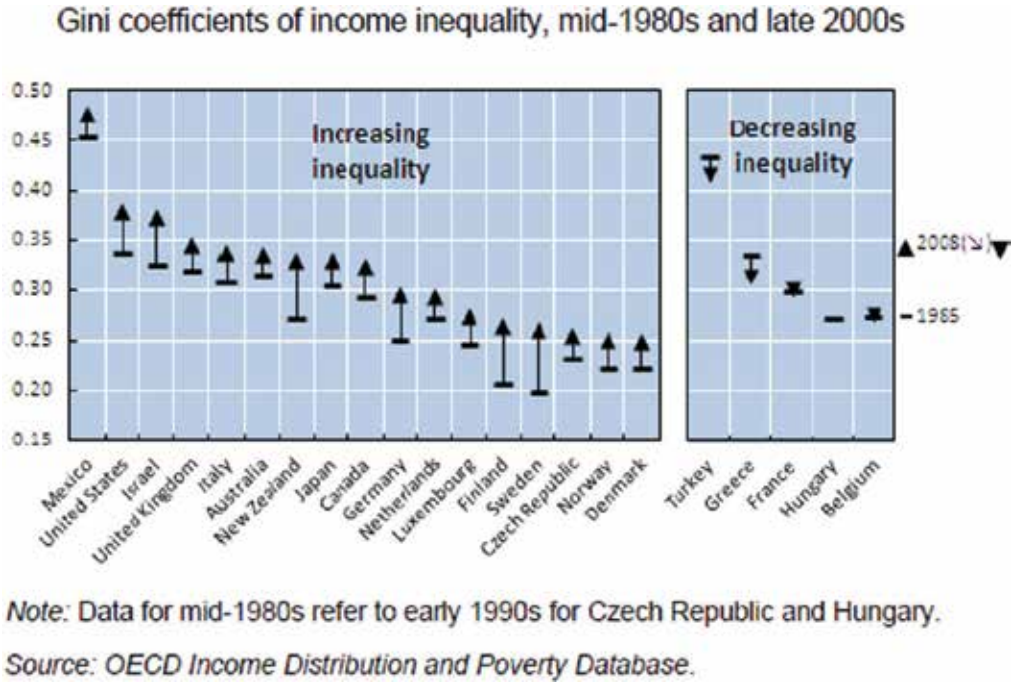

Figure 1. Gini coefficients of income inequality, mid 1980s and late 2000s.

put in place by Deng Xiaoping in the 1980s (first in villages then in major towns) can be considered as a factor contributing to this rise, but some three decades after observing that this trend went on so ubiquitously remains astonishing. The benefits brought by the development of market mechanisms all around the world have been distributed in ways that increased the income inequalities. The generality of this trend is puzzling, even if levels of inequalities still differ among countries. **Figure 1** shows how income inequalities have developed all across the board of developed economies from the mid-1980s to the late 2000s. This figure shows the generality of this trend,[1] even before the global financial crisis of 2008, which of course stands as a major factor fuelling the trend in the last decade. Indeed, as we shall see, a liberalized finance plays a major role in this trend, but one has to take into account that other factors also contribute to this phenomenon. A long-term view of the evolution of income inequality in the USA is very telling in that respect. Much before the liberalization of the banking system around the 1980s, with the dismantling of the Glass Steagall act which had been designed in the 1930s to limit speculative activities (see **Figure 2**), one can observe that inequality in the pre-tax distribution of income has practically ceased to decrease by the early 1950s. Only the post tax distribution of income shows some continuous decline in inequality. This phasing underlines that a decade or so after the big drop in inequality that immediately occurred with the entry of the USA in World War II the mechanisms governing employment and wages in the US economy did not anymore lead to a reduction in income inequality. Only some follow-up in the tax policy contributed to further reduce (lightly) income inequality. As soon as this

[1]With some rare exceptions over the period like France or Belgium on which we shall come back.

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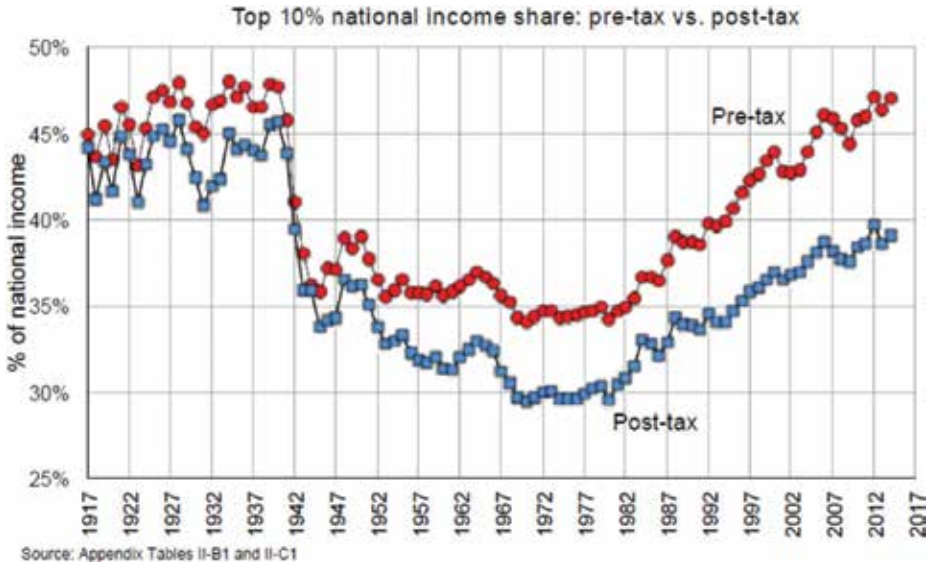

Figure 2. Income inequality over a century in the USA. Source: Piketty et al. [1].

tax policy started to reverse with the diffusion of the neoliberal economic ideology among the policy makers, income inequality (both pre-tax and post tax) resumes a growth that has been lasting till now (see **Figure 2**). The acknowledgment of such lasting trend in income inequality has had an extraordinary echo in public opinions in the western world. The topic is permanently addressed in media as well as in academic conferences. The success of Piketty's 2013 book [2] is very telling in that respect.[2] Still very little has been done in that respect to reverse the trend in raising income taxes. If anything, these taxes have been reduced in some countries to align with other competing economies. Everything seems to show that the very process of globalization fuels a downwards pressure on the levels of income taxation while pressing on low wages and boosting some high wages more closely associated to the dynamics of profits.

Kuznets, Nobel Prize winner in economics in 1971, predicted that trade liberalization would lead first to an increase in income inequalities which would reverse after a while. Though the long trend in the contemporary rise in income inequality does not seem to curb down.[3] Is it due to the scale of the present wave of liberalization of trade or to some other specific factor? How can one explain such rigidity? How can such unequal situation be endured by the populations? How is this politically sustainable in countries which have and are still praising

[2]With more than 2.5 million copies sold of this 700-page book worldwide by fall 2016 (see https://theconversation.com/is-pikettys-capital-in-the-twenty-first-century-really-the-most-unread-bestseller-67713); this success stresses a societal fact, a mix of curiosity and anxiety, worth to be studied in itself.

[3]All the more puzzling that the Nobel nomination of 1971 mentioned that this attribution was "for his empirically founded interpretation of economic growth which has led to new and deepened insight into the economic and social structure and process of development", all of which comforts the idea we want to explore that times have changed after the 1970s.

equality and democracy? The reason has to be looked for in the political history of the specific relations between wage earners and capitalists in all the populations under view.

We shall restrict our investigation to the history of politics in the western economies which have for long been proud of their democratic systems which seemed to go all along with some normative views regarding the spread of incomes and more especially the spread of wages. Such views are social conventions which play a great role in the fabric of societies but which clearly can evolve along time depending on the social and economic contexts. Though such changes in conventions by nature are long processes and one may find difficult to see if a convention is slowly definitively petering out or just transitorily affected. Lessons can be drawn from history in that respect. And regarding the past of the democracies of the western world, a major reference remains the conventions on which, in the aftermath of World War II, the reconstruction of the capitalist regimes took place.

Section 2 will thus review rapidly the conventions that took place in the aftermath of World War II. On this basis, Section 3 will revisit the present situations in order to assess whether a new convention could emerge and of which kind.

2. Lessons of the post-World War II labour-capital compromises

The 1929 economic crisis, altogether with the ensuing disasters of World War II, led large part of the western populations to think that capitalism could not go on as it stood in the pre-war period. All the more so, communism could represent a desirable alternative for growing shares of the population if only to get rid of the spectrum of unemployment. Such stand was made clear in a famous paper of a polish follower of Keynes, Michael Kalecki, in 1943, [3] stating that capitalism will have to ensure full employment, or it would have to be scrapped. Such strong positions can be found in the various programs of reforms that were discussed, more or less in every western country, at the end of World War II. All these proposal, though termed differently and more or less explicitly and comprehensively regarding their view of full employment,[4] shared a common call for a drastic revision of capitalism towards what Shonfield [4] will call a "modern capitalism". A view of the universal nature of this call at the time can be given by the spirit of a conference which took place in Philadelphia in 1944 (cf Supiot [5]), organized by the UN to give a fresh post-war restarting to the International Labor Office (ILO). The articles included in the Philadelphia declaration (presented in **Insert 1**) show how committing was the calls to reform capitalism. By and large these changes occurred in most western countries, and these "modern capitalisms" did effectively succeed within less than a decade to reach their own objectives of full employment and to develop their own welfare state. This diversity will be a lasting figure of this modern capitalism as it will be stressed at the turn of the twenty-first century by Hall and Soskice [6] and Amable and Petit [7]. The imperative of the reconstruction of the huge war destructions in Europe did give a boost to the rapid economic growth experience in most western countries in guiding the aftermath of World War II. A set of international institutions, negotiated at Bretton

[4]A major reference in these calls was Beveridge in the UK and the program of the Conseil National de la Résistance (CNR) for France. A similar call in the USA materialized with the vote of an employment act.

The final declaration, approved unanimously by the participants, reaffirmed four principles (now in the constitution of the ILO):

Principle 1: Labour is not a commodity which encapsulates workers as persons are at the heart of labour legislation and should be protected.

Principle 2: Freedom of expression and association are essential human rights.

Principle 3: War against poverty (required as poverty anywhere constitutes a danger to prosperity everywhere) *and want* (with unrelenting vigor within each nation and by continuous and concerted international effort).

Principle 4: Tripartism (in which the representatives of workers and employers, enjoying equal status with those of governments, join with them in free discussion and democratic decision, with a view to the promotion of the common welfare).

Insert 1. On the principles put forward at the Philadelphia conference organized by the ILO in 1944.

Wood (USA) in 1944,[5] also served as a framework, guiding the development of the western countries, slowly opening up to trade, facilitated by a fixed exchange rates system based on a dollar, freely convertible into gold. Significantly helping has also been at the time the Marshall plan launched by the USA to ensure a quick resuming of the European economies. All these special circumstances did accompany the turn towards these "modern capitalisms", also qualified as welfare states, to refer to the role of the state in the organization of the welfare systems that were then developed. Still one should not be misled and think that these times were those of harmonic peaceful relations between labour and capital. The development of these welfare states has been marked by continuous struggles (mainly strikes) to increase rights, transfers and wages. All these improvements were parts of the current political debates. The issues were more on the timing of these measures, considering their actual feasibility, than on their principles which had been somehow acted with the big employment conventions of the World War II aftermath. It took also some times to the workers themselves to realize that major changes had occurred in the working of capitalism. Only around the 1960s did they realize to what extent their ways of life, social protection and aspirations had changed, with access to the American way of life, with their equipment goods, of which owning a car stood as the more symbolic, becoming the new normal. Somehow the widespread protest of the youth, at the end of the 1960s, was linked with the consciousness that the emergence of relatively affluent, more consumerist societies[6] was bound to change the old patterns of social relations. Strangely enough, another face of the coin showed up rather rapidly at the turn of the 1970s: the impact on the environment of this development, using intensively natural resources. A report stressing the limits of growth was widely diffused (cf. [8]) but seemed at the time to have a limited influence on policies, much concerned by the slowdown in economic growth which occurred then. In effect, in this more consumer-oriented world, fuelled by increasing trade flows, the trust in a gold exchange standard, based on the dollar, suddenly collapsed, largely due to the costs of the Vietnam war for the USA. A system of flexible exchange rates soon replaced the gold standard fixed exchange rate system. The transition rapidly fuelled waves of interrelated inflations of domestic prices, mainly launched by a high rise in

[5]Where Keynes himself played a great role

[6]Indeed the protests of the youth around 1968 had many origins, but looking at some of the references like Marcuse, the trend towards a more materialistic, more individualistic world was one of them.

oil prices, set up by the OPEC, a coalition of oil producers, eager to protect their incomes in times highly uncertain. This oil price shock in turn led to a sharp slowdown in the economic growth rates of the western countries and to unprecedented rises in unemployment, thought in the first place to be transitory. Policy makers at the time focused on the reduction of inflation as the main way to adjust to the change to a flexible exchange rate regime. In this fight against price inflation, the liberalization of the economies became the main motto and wage rigidities the main factor in accusation. The flexibilization of labour markets surged as a major policy issue. At this point the contradiction with the big labour-capital compromise became obvious. Full employment had lost its priority, and the sharing of productivity gains was not any more the major determinant of wage increases. Though of the full employment convention had not entirely disappeared. Policies against inflation were still presented as a transitory mean to adjust to the competitiveness among countries introduced by a flexible exchange rate system. At the turn of the 1980s, as the situation was not improving a decade after the collapse of the Bretton Woods fixed exchange rate system, another kind of argument was advanced. Free market economics would bring to the workers a consumer surplus, the reduction in prices of consumer goods helping to rise their purchasing power. The argument was weak as what the workers could win in such bargain was largely overtaken by the losses induced by increasing unemployment and a stagnation of wages following the flexibilization of labour markets adjusting to the rising competition of low-wage countries. Still this argument has been advanced by such "populist" leaders as Reagan and Thatcher, a way for them to sell the Friedmanian turn in the public management of the western economies. Within a decade or so, this turn to free market economics made it clear: a vast majority of wage earners were the losers, and the theme of the consumer surplus was not heard of anymore, if only in the handbooks of the apologists of this free market economics, attached to the formal beauty of the highly unrealistic neoclassical model of general equilibrium. This "silent revolution" (to echo Gill [9]) which put an end to the references to the full employment convention of the post-war period was somehow completed in the early 1990s with the demise of the communist alternative, as symbolized by the fall of the Berlin wall. Meanwhile the consumerist movements that emerged in the 1970s and early 1980s petered out in the 1990s (as shown by the rise and fall of Ralf Nader in the political scene of the USA[7]); no alternative convention emerged from the political debates. The main benefiter of this liberalization of the economies has finally been the financial sector. It took advantage of the liberalization of trade and capital movements to develop its operations at a global level. The rising role of finance, which much contributed to the hollowing out of the full employment convention, is still far to have been unanimously accepted. For some it is a key factor for the adaptation of the economy; for others it fuels all kinds of speculations, leading to detrimental financial crises, tax evasion and wealth concentration. Strangely enough finance even succeeded to find ways to develop financial services for an impoverished working class, diffusing new specific loans for housing or acquiring equipment goods (see [10, 11]). The sub-prime loans were one of these tools and will remain in history as the uncontrolled financial instrument at the origin of the 2008 global financial crisis. The securitization of uncertain loans (e.g. potentially non-performing loans) created lots of financial havocs. No wonder that so many politicians have issued bashing statements on finance and all the more surprising that so few actions have

[7]A fall that went so far that Ralf Nader at the presidential election of 2000 said to prefer Bush for a shock therapy to Al Gore, that he considered as an anaesthetist.

been taken to domesticate it.[8] A good reason may be that the 2008 GFC (global financial crisis) has shown the limited power of countries to coordinate their actions vis à vis a world of finance, largely interconnected and including some major financial powers, giving a new dimension to the "too big to fail" argument. It does not follow that all citizens had a dual view of finance. The need to domesticate finance has become in the process a clear dividing lines between pros and antis, between those who would like to go back to a boaring finance[9] (to quote Bidhe [12]) and those who see In a liberalized innovative finance an efficient tool of development. Still those in favor of a domestication of finance remained in all developed countries a minority. On the other side, an apathy, if not a sympathy, towards the role of finance has been developing a long time with what can be considered as a passive corruption of large parts of the elites. The financial sector, widely speaking, for example, insurance and business services, has strongly contributed to an incredible widening of the wage scales in most activities. Pretending to reward individual productivities (where in most cases they cannot be distinguished from collective ones[10]), they paved the way for a general expansion of the wage scales. While major entrepreneurs of the 1950s and 1960s supported a norm of 1–10 between wages in a given enterprise; this ratio went up to some 400 in some industries at the turn of the twenty-first century. It became so much out of the current social norms that Obama could in the years 2000s regret the existence of such "obscene wages" (see [13]). No wonder then that, with such devastation of the full employment conventions of the post-war era, researchers like Piketty could observe a steady rise in income inequalities (see Section 1). Even more alarming this trend, legitimizing wide scales of wages, was not a transitory phenomenon, linked with a generation that had the opportunity to experience the turn towards a new free market economics; it also tended to become a new normal for the new elites entering the flexibilized labour markets. The financial sector did attract in the 2000s a fair share of the elite of the major schools of the western world (see Colander [14] for the USA). Such largely extended wage hierarchies, at a time when conversely the wage labour status was itself divided into many kinds of petty jobs, had thus became more or less a common trait in the developed economies. Does that mean that the erosion of the full employment conventions, a silent revolution indeed, considering the lack or weakness of protests on the political scenes, had been accomplished by the time of the 2008 GFC? Indeed a good share of the new social elites seemed both largely internationalized and considering as a new sustainable growth regime this world, where most of the norms regarding distribution (with wide ranging wage scales) and production (with international games of mergers and acquisitions) have been set by the financial sector. Indeed authors coined the term financialization to characterize such new regime.[11] The whole question is then whether such regime is transitory or sustainable. To answer such question, one needs to pay more attention to the factors of change and to the various challenges met by our societies.

[8]A typical instance of such duality is given by the President Hollande who first claimed, while campaigning, that "finance" was his enemy and who finally did not dare to do anything, for fear he could only harm French Banks in a world of globalized finance, well out of reach of national policies.

[9]Until its abolition by Bill Clinton in 1999, the Glass Steagall Act voted in 1933 restricted branching and forced banks to deal either with securities or with commercial banking but not with both.

[10]If only in very specific cases where the financial values of individuals are given by a specific market, as it is the case for actors in sports or in the showbiz or can be tied to the results of their operations as with the traders in finance.

[11]For an overview of the socialization of this process of financialization, see the special issue of the Revue de la Regulation https://journals.openedition.org/regulation/12337 and especially the interview of a specialist of the issue Greta Kripner [15].

3. Towards an era of new compromises or the entry in times of post democracy?

Indeed the political debates around the financialization of most of the developed economies lead one to consider it as a rather transitional regime as it looks politically unsustainable.[12] The success of Piketty's book, denouncing the long and widespread rise of inequalities within countries around the world is showing a wide questioning, which in a democracy could become the basis of a political rejection of such financialized regime. But this display of an anxious questioning in a broad social class of educated people does not seem sufficient for such political turn around.[13] The fiscal policy measures recommended in the book, such as a tax on wealth that would apply across the globe (to take into account fiscal evasion), did not rally masses of citizens and had little echo in political debates. They may have looked too far out of reach to mobilize a large political movement. It does not follow that these denunciations had no impact. They contribute to some consciousness of the drawbacks of the present development regimes, weakening the positions of those who try to legitimize them and strengthening all those who are in favor of radical changes. In that sense it is an active determinant in the class struggle that is developing between labour and capital in the moving context created by the hollowing out of the full employment conventions. Interestingly enough there has been other examples of similar denunciations which helped to forge new "compromises" if we can apply through times this notion (which seems rather fitted for the "modern capitalism" mentioned above). We could refer to the hygienists who denounced the poor health state of the working class in the early age of industrialization, endangering the very reproduction of the capitalist regime and thus helped to raise the social issue. But this was a rough and primitive phase of capitalism. Some decades after, while a more mature capitalism, under the pressure of rising social conflicts (see Marx Communism Manifesto 1868), had taken on board that it had to address a social question (as shown in Germany with the creation by Bismarck in the 1880s of a first kind of welfare state), a book on income inequality had a wide audience. *Progress and poverty* (1879) of the American essayist Henry George was sold for over 3 million copies [16]. The book focused on the rent that land owners enjoy from the development of the economy that the industry of labour and capital produces. George called for a significant taxation of this rent which could help to enhance development in financing public utilities and measures of welfare (including a basic income scheme). The book had a lot of influence not only in the USA but also in the UK. It was inspiring in launching the progressive era that would lead more than half a century later to the "modern capitalism" referred to above. It thus, for instance, was one of the references in the creation of the Fabian Society in the UK. This current of thought was clearly reformist, proning a soft transition (Fabius, the Roman model, was famous for his art of delaying to wait for the good timing) and not at all hinting at gathering a

[12]While its economic sustainability seems constantly under the threat of rising risks of major financial crisis, not too speak of its highly limited capacity to act on the environmental issues, as it appears more and more clearly with the failures of free market mechanisms to cope with environmental issues. See also Boyer [17].

[13]Very few people fear like Alain Minc, French essayist and business man close to Macron, that inequalities are too high and that we risk some insurrection.

momentum that would have helped a full change of labour-capital compromise.[14] At the same time, the writings of Karl Marx were much more challenging of the existing political order, as they focused on rising the political consciousness of those under the discriminatory pressures of the capitalists for their living. To have any significant leverage effect, the denunciation of inequalities has to come with a clear exposition of who win, who loose and in which manner. The readership of the two books on inequality did feature who are the winners, but how does it happen and how could it be stopped remain unclear. In such context, to call for taxation, be they specific, remains vague. The political mobilization, required for such taxations to effectively occur, has to be done on a broader base, explaining what will be done with these taxes and how it would change the labour-capital relations.[15] This political incompleteness of the mere denunciation of a rising income inequality is shown by the facts that the major political movements contesting the present state of the compromise between labour and capital are the so-called populist movements which in the first place claim their opposition to the internationalization of the economies, which they saw as the main cause of unemployment and hardship. Most of these "populist" movements have become protectionist and accuse most of the elites to form a new international social class. Still they are not calling upfront for taxation policies that would reduce income inequality within countries.[16] Indeed the electorate of these populist movements cannot be characterized by specifically low levels of income.[17] As surprising as it may be, the denunciation of rising income inequality is not rallying the electorate of populist movements, nothing like the rallying effect of the migration issue. The fact that little attention is paid to income inequality invites to consider these populist movements as a phase in a deeper political transformation. Mouffe and Errejon [18] thus speak of a "populist moment", stressing the transitional nature of the emergence of these movements. It seems all the more relevant that their silence on the rise in income inequalities could well lead to major splits within these movements.[18] Could such split fuel some political recomposition? Indeed the opponents to these populist movements represent a large variety of stands, regarding the present trends of internationalization. As a matter of fact, those who accept or support more or less actively this internationalization remain most often divided in at least two political parties, reproducing an old right and left division. Some authors identify the most active supporters, as technocrats (see [19]); others denounce a supranational elite, although these groups do not constitute effective political parties. These outspoken supporters express their beliefs in the benefits that the international order, governed by the set of existing international bodies, has delivered and will continue to do so in the near future. Still the opinions in this broad loose

[14]Incidentally Henry Georges was much in favor of free trade, praising its advantages in terms of consumer surplus, an influence which may be why Reagan and Thatcher used the same argument to support the turn in the early 1980s towards economic liberalism.

[15]Olivier Blanchard, ex chief economist of the IMF, does suggest in an interview in Le Monde (July 10, 2018) that it is necessary to extend the redistribution, in terms of negative income tax and increases in public spending on education in order to reverse the rising trend in income inequality, adding that governments are acting too slowly on this objective as they are on climate change.

[16]At the turn of the 1970s, some populist movements like the Front National in France were clearly in favor of economic neoliberalism and only progressively turned to call for protectionist policies, still being relatively silent on income inequality among nationals.

[17]As shown with the 2016 US presidential election where the lower income class voted more for Clinton than for Trump.

[18]This transitional aspect is also stressed in Coates [20] who refers to Gramsci notion of "morbid symptoms" between two social settlements.

group vary largely depending on the type of market mechanisms that should in their view prevail in the dynamics of further internationalization. Some strongly believe that market forces, led by price competitiveness, should be the driving force, and their favorite policies are geared towards the reduction of tariffs. Others pay more attention to the fact that norms of products and production modes should evolve in order to meet the various challenges encountered in the course of the expansion of internationalization. Trying to avoid worsening of labour conditions (such as uses of child labour or slaves) has been among the first calls for normative actions. Monitoring the freedom of investment and the mobility of capital in order to limit unfair competition linked with too big disparities in financial power has been another topic of concern, not to speak of fiscal competition among trade partners. Intellectual property rights are also a matter of continuous harsh discussions, be it on their amount or on their duration. Clearly for this second group of supporters, the regulation of markets by means of norms of production and products is an ongoing concern conditioning, a proper functioning of markets that would effectively increase the well-being of the populations. In this context common to most developed economies where a broad group has more or less actively supported the recent trends of internationalization, two new factors are bound to exacerbate their division and may lead to a split. The first factor is that tariffs on trade have been extensively reduced and it is much more disputable to pretend that further reduction in tariffs could lead to an increased internationalization that could benefit all trade partners in terms of growth and employment (see Reza [21] who points at various official reports showing the opposite). It follows that the reduction of "invisible" barriers to trade (e.g. non-tariff) tends to become a central issue for any further internationalization, a perspective which is highly dividing the group which had been so far open to internationalization. The second factor, which is also fuelling this gap, is the widespread and rising acknowledgment of major threats on the sustainability of our patterns of development which is calling urgently for new norms on products and modes of production. The sharp inflection of the monitoring of the internationalization that this acknowledgment implies is a rising source of conflicts. The supports of internationalization will for a sizeable share of the group become more and more radically conditioned by strict norms on products and modes of production, while the "dedicated free marketers", only concerned with price competitiveness, will consider as abusive the burst of non-tariff barriers to trade. Could such a turn of affairs lead to a political restructuring ending with a new social settlement? Indeed, if the rising income inequality leads to a split of the populist movements, while their opponents split on strict monitoring of markets, there could be some room for a reconstruction of a renewed left. Much depends on the new solidarities that could emerge in this process. If the search for more sustainable development paths leads to support short production-consumption circuits, circular and collaborative economy, it may help low-income people in reducing their current expenditures. Still such restructuring has little chance to occur right away at national levels, where charismatic populist leaders see to it that no political alternative emerges. Chances are more open for such political restructuring to occur at local levels. In that respect it has been widely stressed that even if the rationale for ecological policies is strong, pro-environmental actions are really mobilizing people when experienced at local levels, while their purpose remains too abstract at national or international level (an argument rightly put forward by Latour [22]). In that perspective environmental policies could, through a bottom-up process, taking advantages of a multitude of local experiences, effectively initiate

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some political recombination. It would have to be relayed at national levels by policies accommodating the policy requirements expressed in the diverse local experiences. But for this political recombination to be itself sustainable, the whole process needs also to be relayed at the international level. Only then would we end with a sustainable compromise around environmental issues. This last transformation at the international level is not in itself a minor step. Part of the rise of the populist movements seems to have come from the exteriority of the supranational level in diverse regional union. As stressed in Aglietta, leron [23], the resentment of populations vis a vis the supranational institutions came from the lack of political involvement of the people in the running of these supranational institutions, all of which adds to the complexity and hazard conditioning the emergence of a lasting new compromise. The worry comes also from the fact that such multilevel arrangement is bound to take time when precisely most of the environmental issues imperatively require rapid actions to be taken. The huge challenge of the international process of negotiations monitored by the United Nations is precisely to speed up the processes of local transformations worldwide in order to prevent a fatal degradation of the environment. If a new democratic and efficient global governance of the environment does not take place rapidly enough, there is a big risk of conflicts between countries that will have turned into aggressive authoritarian states under the influence of unreconstructed populist governments.[19]

4. To conclude on the narrow road that could lead to a new compromise

Under the auspices of the United Nations Framework Conventions on climate change (UNFCCC), a series of Conventions of the Parties COP have been meeting every year since the Rio Earth Summit of 1992 to discuss how countries could cooperate to meet an environmental challenge increasingly acknowledged as threatening human survival on earth. The Paris Convention of the Parties (COP21 in December 2015) succeeded to rally all countries, developed and developing, in committing themselves (by means of Nationally Determined Contributions) in this battle. This was soon followed by the expression of 17 objectives, the Sustainable Development Goals (SDGs), listing the various types of actions to be undertaken to win this battle. These objectives took seriously the three dimensions of the global objective of sustainability, combining environmental sustainability with social and economic sustainability. This declension implies that the battle can be fought at various levels, be it the nation, the region, the city or the neighborhood. It thus opens to the development of new social links of cooperation, solidarity and responsibility that may significantly contribute to the reconstruction of the populist movements that we alluded to in the above section. A major plague of the last decade of growth and internationalization has been the development of misery (as distinct of poverty[20]) even if economic growth has helped to reduce poverty, especially in developing countries. Misery is often linked with an urbanization where the poor have lost

[19]A trend exposed in Crouch [24] assertion of our entry in a post democratic era.

[20]A distinction clearly expressed by Joseph Wresinsky, initiator in the 1960s of International Movement ATD Fourth World "Poverty, material deprivation, oppression inflicted by those who have power are hard to bear. What is truly insufferable however is being despised and continuously reminded that one is an inferior and utterly useless being".

their communitarian links.[21] Incidentally, the last two decades have also been the ones where the share of menial precarious jobs in developed economies has significantly increased. A major characteristic of this precariousness, beyond the relative poverty of these workers, is the lack of secure work-based identity (as stressed in Standing [25] book), and in that sense, it also impacted formal jobs in developing countries. In this context, the battle at various levels to promote the SDGs becomes a potential major instrument to counter this trend and restore the citizenship status which is lacking so crudely. This reconstruction of settlement status would significantly reduce the attractiveness of the populist movements and force the reconstruction of the populist movements called for. Making such assessment, we are confronted with the discussion reported in Milanovic book [26], opposing legal inequality and income inequality. Milanovic, following Therborn and Piketty, underlines the danger of a single-minded focus on existential inequality, which may seem to be the case when we insist on basing identities on a secure work. As a matter of fact, one has to stress that comprehensive and effective promotions of the SDGs are also bound to develop a fair size of non-market activities, promoting the (re)creations of Commons, the emergence of cooperatives and practices of collaborative activities. The insistence on the local levels of action goes in that direction; the construction of a new compromise that should gain some momentum is a largely bottom-up process. The size of the expansion of non-market activities is bound to produce a real break towards what could be called to the least a "Modern capitalism number 2". Nevertheless to reach such momentum, the process will need to rely rapidly enough on some scheme of basic income.[22] There is a wide range of such possible schemes if one includes to a basic monetary transfer some free access to goods and services as well as opportunities of financing various personal projects with local complementary currencies. In such perspective, the emergence of a new compromise between labour and capital at a truly international level would certainly take a big diversity of forms, even more than it did with the post-World War II compromise, with a logic driven by a continuous adaptation to environmental changes. It should also rapidly lead to a political recombination, splitting the old populist trends for ex-followers to take part in some of the new non-market activities, becoming more and more part of the modern ways of life. New alliances will be passed with those parts of elite classes favoring internationalization, providing that markets are strictly regulated to preserve the environment and the human beings. A growing fraction of the new generations, more and more concerned to take part in activities contributing one way or another to the SDGs, will support such alliances. Old dedicated free marketers and unreconstructed reactionary populists may maintain some oppositions, bound to decrease as market mechanisms will be more and more unable to cope with the degradation of the environment. But again the new compromise has to gain rapidly enough momentum to contribute to the expected adaptation to our changing environment with the risks if it fails to leave the room to authoritarian regimes and endless open conflicts.

[21] A distinction already stressed by the French writer Charles Peguy in 1902 and reused by Paul Goodman commenting the war on poverty launched by President Lyndon Johnson in 1964. Let us notice passim that 2008 is also the year where urban population became a majority in the world population.

[22] In that sense the approach of Guy Standing is very consistent, being one of initiators of BIEN, Basic Income, European Network, while developing his work on the extension of the precariat.

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Chapter 3

Inequality in Educational Development from 1900 to 2015

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Additional information is available at the end of the chapter

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Abstract

The industrial revolution marked a turning point in mankind as it not only initiated an economic turn from predominantly agricultural to industrialized societies but also shaped the need for an education revolution. This was the period when most industrialized societies implemented compulsory schooling systems and created the opportunity for universal access to basic education and later medium and higher education levels. However, this did not occur at the same speed everywhere, generating divergence between countries, and subsocieties within countries, whether it was at the level of residence, gender, generation, or class. Based on a dataset developed at the Wittgenstein Centre for Demography and Global Human Capital reconstructing levels of education in 5-year steps by age (5-year age groups) and sex for a large number of countries in the world, we look at the education transition from 1900 to 2015 to uncover different patterns and pathways of educational improvements that might explain the differences in the level of human capital today.

Keywords: education, demographic trends, human capital, population reconstruction, gender gap, JEL Code(s): I21, I24, I25, J11, J24, O10

1. Introduction and context

The twentieth century has witnessed many economic, technological, political, and societal changes. There is a large consensus that increased education played a role both in the initiation and diffusion of the many transformations that have occurred over the last 150 years. However, less is known about the structural effect of education in a comparative manner,

meaning what was the specific contribution of education globally at different levels, e.g., age, gender, and how did the pace of education diffusion differ between countries. In order to do this, one needs detailed data on educational attainment. The work that we are presenting here is part of an effort to create a globally consistent and comprehensive dataset on educational attainment by age and sex in the twentieth and twenty-first centuries. This shall be achieved by reconstructing the changing country-specific educational composition of 185 countries from 2015 back to 1950 (WIC 2018) and in the context of the *Education in the 20th Century* (EDU20C) project for selected countries back to 1900. This paper will focus on the second part by illustrating the theoretical framework, methodological challenges, and principles, as well as the results for selected countries.

Today, the availability and quality of global data on educational attainment are quite substantial as it is part of most data collection exercises, i.e., censuses, registers, and surveys. Data on educational attainment can be mapped according to the International Standard Classification of Education (ISCED) (see Section 2.1), which is a standardized categorization scheme that is widely recognized and used [1, 2]. However, the awareness about the importance of collecting internationally consistent and comparable data on educational attainment is relatively new. Most countries only started to collect these data according to their national education schemes not before the mid-twentieth century, and the implementation of the ISCED did not occur before the 1990s. Hence, most existing historical data on education suffer from several flaws that make them difficult to compare across countries and time: different measurements of educational attainment, different schooling cycles, different years at measurement, changing definitions, and changing political borders due to military conflicts and political upheavals [3–5]. For this reason, comparisons across countries over time and cohorts have been at least challenging, but often unfeasible.

As a result, a few researchers have looked at ways to reconstruct/estimate past levels of educational attainment. Those efforts follow two main methodological streams. The first that was primarily developed by Barro and Lee [6–9] was to use existing data points to inter- and extrapolate the missing data using a variety of methods such as linear interpolations or the perpetual inventory method. This approach was adopted and further used by other researchers like De la Fuente and Doménech, Cohen and Soto, and Morrisson and Murtin [10–12]. The second stream, which was introduced by Lutz et al., relied on back-projecting educational attainment using the multistate population projection methodology [13]. This approach takes advantage of the attribute of education that is primarily acquired at young ages and becomes a fixed attribute for most people in their remaining life. Hence, by using the cohort-component method, the educational distribution of a population at time t can be translated into the educational distribution at time t-n, when applying assumptions about education transitions as well as mortality and migration differentials by education. This method was later adopted by Barro and Lee, De la Fuente and Doménech, and Cohen and Leker [8, 9, 14, 15]. This methodological principle provides the basis for the reconstruction model used in this work, with substantial adaptations and further developments that will be described later in this text.

The project presented here aims to reconstruct past levels of educational attainment by age and sex of the population of selected countries from the beginning of the twentieth century up

to the present. The result of this effort is to create a complete, harmonized, and consistent time series in 5-year steps of the levels of educational attainment of the population by age and sex ranging from 1900 to 2015. It is the first step of a larger endeavor to reconstruct the past levels of education for most countries of the world in the twentieth century and to contribute to the wider understanding of the socio-economic developments in the last century.

1.1. Historical and theoretical framework

Research on educational expansion focuses on timing and pace of formal education formation and development in the context of historical and socio-political conditions. While lacking a *"grand theory"* that integrates multiple paradigms, the main theories addressing the potential causalities behind the education expansion from different, partially competing, perspectives are concerned with themes like industrialization, social privilege, and nationalism [16].

Since the early beginnings of education in cleric schools and temples in ancient civilizations, like in Egypt or China, it has been used as medium to pass on knowledge but also ruling structures, moral standards within societal hierarchies and class structures (i.e., from emperors via administrators and clerics to the regular people) and between generations. Shifts in societal (i.e., secularization or modernization) and political systems always came along with shifts in educational paradigms, like the provision of formal mass education, to provide the necessary skills for a productive workforce, create allocation rules for people to social classes and positions in the labor market, as well as to legitimize and reinforce the political ruling system by promoting nationalism to assure obedience [16–18].

The comprehensive implementation of formal and compulsory education systems started in the eighteenth and nineteenth centuries. The end of the nineteenth century and the beginning of the twentieth century was marked by the rise and fall of political systems, empires, and nations. While at the beginning of the century, most of Europe were ruled by monarchies, the political, and territorial landscape, which was deeply shattered as a consequence of the First World War (1914–1918). Multiple dynasties disappeared like the Austrian-Hungarian Empire (1804–1918), the German Empire (1871–1918) as well as other German Kingdoms (i.e., Bavaria, Saxony, Hanover, Württemberg), or the Russian Empire (1712–1917). These political collapses came along with a reshuffling of the European territorial landscape with the foundation of multiple new nations and an increasingly precarious economic situation in the interwar period. This period saw also the emergence of fascist and communist ideologies.

In those political reframing's, education played a major role for transferring and indoctrinating the population with the new ideologies. It was also used to legitimize the new political structures and the societal stratification in social classes [16, 18, 19]. Independently from their ideological orientations, the nation states, i.e., Italian Fascism, Austrofascism, Nazism, Communism in the Soviet Union, the Francoist Spain or the later German Democratic Republic, were unified in their intention to use literacy and education programs to grant access of all societal classes to primary and elementary education to create uniform and obedient adolescents, workers, soldiers, and peasants. Here, as well as in the former monarchies, individual autonomy and deviant societal and political ideologies of citizens were tackled

early on to avoid critical thinking and societal upheavals educating citizens with ideologically charged curricula, which was an instrument to maintain social stratification and equilibrium within the society. Apart from capitalist societies that promoted social stratification in a only seemingly pervious meritocratic system, even in self-stated classless ideologies, like socialism or communism, elitist structures were formed to separate the ruling class from the bureaucratic and legislative apparatus and the working class [18, 19].

These changing societal, economic, and political conditions are mirrored in the general theoretical discourse. For instance, the sociological **theories of education** study its role for national societies and economies in terms of educational structures, processes, and practices. This strand of sociological research focuses on the interactions of social, educational, economic and political systems and structures on different levels, reaching from a macroperspective down to inner classroom interactions between students and teachers. Émile Durkheim laid the foundation for this theoretical school with explicitly examining the role played by schools in educating students to participate in social systems and become productive members of society [20–24]. Sociology operates within the three main theoretical perspectives, namely consensus (or functionalist), action (or interactionist), and conflict perspective [23–26].

The **action perspective** originates from Weber's Interpretive Sociology, which focuses on subjective capacities of actors on an individual microlevel and their links to action and interaction, whereby along with phenomenology and ethnomethodology, the (symbolic) interactionism has shown to be the most prominent. The **consensus** and **conflict perspective** are system theories that focus on macrolevel processes from different perspectives. The conflict perspective, also denoted as **conflict theory**, has multiple strands, including Marxism, neo-Marxism, critical theory or feminism, whereby the consensus perspective is mainly represented in the **(structural) functionalism theory** [23–27]. Both, conflict theory and (structural) functionalism adopt a macroperspective [24, 26, 27], which is more relevant for this paper. **Structural functionalism** for instance claims that education's most crucial role is to educate students to become productive members of the socially and economically stratified society and to maintain, legitimate, transmit, and internalize a "collective conscience" rather than challenge the societal status quo [25, 27]. Representatives of this strand like Davis and Moore or Parsons state that schools are systems of social stratification in which all people get allocated to a role in society suiting their abilities and status. Schools serve in this system as bridges the gap between the particularistic values of the family and universalistic values of society [28, 29]. Schools pass on two major values, namely the value of achievement (meritocracy) and the value of equal opportunity [29]. According to Merton, schools serve, beside their manifest function of educating students, a latent function to pass on norms and values to ensure social stability and prevent societal upheavals. This is often referred to as *"hidden curriculum"* [30]. In this context, the improvements in educational systems, i.e., implementation of compulsory school, serve not only the conservative and integrative function to transmit the cultural heritage of older to younger generations and to maintain social order, but to guide pupils according to their abilities and social status from their joint family to their social and economically predefined status in the society. This creates and maintains social inequality, which is perceived as social necessity and not challenged, as schools shall solidify the social stratification, ensure stability, and social order in society at the expense of social change [24, 27].

The **conflict theory** [31–35] is in agreement with structural functionalism in the sense that both state that schools contribute to social, ideological, and labor force reproduction. Thereby, functionalism perceives this social inequality as a necessity while the conflict theory as a structure preventing equality, which has to be challenged from within the system. Education systems in both strands produce economically and politically obedient citizens that function according the economic requirements of a society. This also means that according to those strands educational progress in societies is determined by the economic needs of the labor market [23, 24, 26, 27].

At the macrolevel, education has been widely acknowledged to be a proxy for socio-economic development [5, 36, 37]. This thinking is in line with the basic premise of the **human capital theory** [38] that refers to the aggregate stock of competencies, knowledge, social, and personal attributes as abilities to create economic value [24, 37]. Human capital theory has been frequently cited, mainly by economists and demographers, to justify social and economic policies and reforms within and outside the education system. The theory as such emanates from the two neoclassical economic paradigms, *methodological individualism* and *rational choice theory*. Both highlight the individual as root of all social phenomena. Individuals in their human behavior are considered to act mainly in self-interest to maximize their economic benefits. Individuals acquire knowledge and skills to increase their productivity and in an ideal labor market their income and wealth. This stands in sharp contrast with the *methodological collectivism* that assumes that social phenomena cannot be reduced to individual actions, but are products of social, cultural, and environmental factors [37]. From this theoretical perspective, individuals are economic units, whereby investments in individuals serve economic interests to contribute to society as education is seen as an investment to stimulate productivity and economic growth not only for the individual, but also for the society. Education or the ability to perform labor is part of the economic capital, which shall ensure the acquisition of knowledge to generate higher income and serve the requirements of the national economy, which is a further elaboration of the structural functionalism perspective. Cunningham argues that education has a social aspect, which means that personal and social dimensions are mutually dependent. In this line of thinking, people construct and shape social structures, but are also influenced and framed by them. Therefore, individuals cannot be conceptualized outside of their societal and economic context [37, 39]. Both individualist and collectivist perspectives can be considered in the framework of the human capital theory.

In the field of demography, the most prominent theory is the **demographic transition** theory, which describes the different stages of demographic development in terms of changes in the mortality and fertility characteristics of societies and their potential implications on future population developments [40–44]. Education plays a crucial role in demographic development as it affects negatively the fertility of women and the mortality of children and adults. **Figure 1** illustrates demographic developments by means of the changing pattern of life expectancy at birth (y-axis), total fertility rate (x-axis), and population size (bubble size) by countries and regions for 1900 (gray) and 2018 (color). In the last 120 years, most countries showed remarkable increases in life expectancy, while the total fertility rate (TFR) has been rapidly declining, with Northern America and Europe as frontrunners, followed by Latin America, Oceania, and Asia, while most African countries are lagging behind. In the process of demographic transition, the population has substantially increased from 1.6 billion in 1900 to 7.6 billion in 2018 [45, 46].

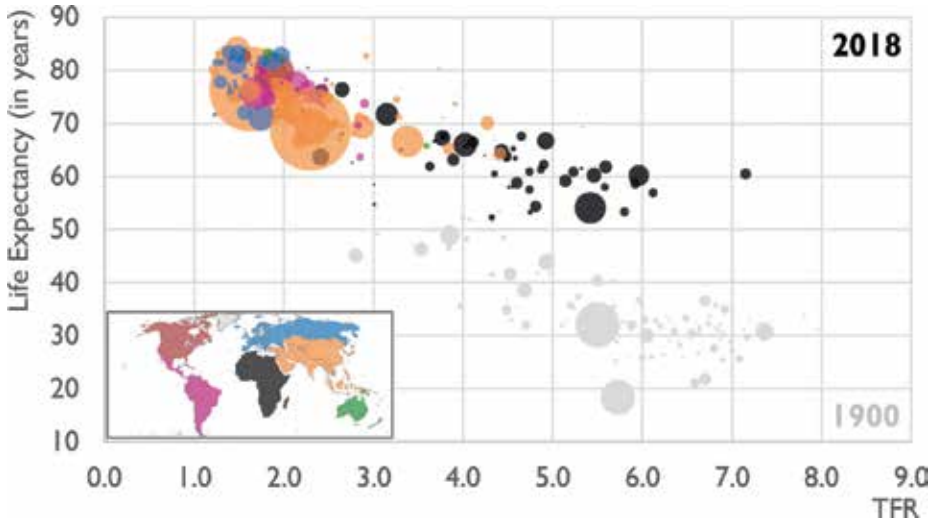

Figure 1. Life expectancy (y-axis), TFR (x-axis), and population size (bubble size) by country and continent in 1900 (gray) & 2018 (colored bubbles) ([45, 46], authors' illustration based on data from [47]).

Education is on the rise everywhere as many countries have essential part of their economies moving to knowledge activities. In this process, younger cohorts are increasingly gaining access to higher forms of education to suit the economic requirements. Over time, these steadily better educated younger cohorts started to replace the older and less educated cohorts in the workforce and general population. This has been causing a shift in the overall educational distribution of the society from lower to higher educational levels. Lutz (2013) describes this process of societal educational improvements due to cohort replacement in his **demographic metabolism theory** [36], which is based on concept of cohort replacement [48–50].

These shifts in educational progress are at the core of this work as described in the following sections.

1.2. Scientific impact

This work has a high potential scientific impact because it provides historical data on education to be used in models that both address and quantify the role of education in demographic [5, 51], econometric [9, 52], environmental [53, 54], technological, etc., developments, or need education as a as proxy for socio-economic development. Information gathered from the past can in turn inform the future in terms of policy and public investments.

The twentieth century was a century of change when it comes to the mutually reinforcing demographic, economic, social, political, and technological transformations during this time. The massive global gains in the educational attainment can be considered as contributing factors to those processes [5, 44, 55]. Available international datasets show lacks in consistency when it comes to comparability of used educational categories and data quality of model input data [9–12, 56], mostly because they rely largely on existing data points on education that have many flaws. This project also uses historical data but to a lesser extent and not without validating them first. As a result, this work is an important contribution to reconstructing the

historical educational composition and gain further scientific knowledge about the dynamics of educational development.

1.3. Geographical focus and data availability

The availability and reliability of global data on educational attainment has substantially improved in the last decades so that nowadays it is possible to retrieve education data from recent censuses, registers, and surveys and harmonize them according to the International Standard Classification of Education (ISCED) mappings [1, 2]. However, this does not go without any difficulties as documented by Bauer et al. [3], Speringer et al. [4], and Goujon et al. [5].

However, the further one goes back in time, the sparser availability of historical data on educational attainment, as most countries in the world did not start systematically collecting this information before the mid-twentieth century. The only data on education for the first half of the twentieth century were, if even available, on literacy or enrolment. This notable lack of consistent long-term data series and inconsistencies in historical census records make it necessary to reconstruct the educational composition over the course of the twentieth century.

The authors of this paper aim to model harmonized time series on education by reconstructing the levels of educational attainment by age and sex for selected countries for the period from 1900 to 2015. This work contains two strands of reconstruction. Firstly, the educational attainment was reconstructed for 185 countries in the world from 2015 to 1950, updating hereby the mid-term reconstruction iteration to 1970 published in Goujon et al. [5]. Secondly, the education in the twentieth century (EDU20C)[1] project aims to create harmonized time series for about 30 countries back to 1900 (see **Figure 2** and **Table 1**), whereby the list of countries will be steadily extended.

The 30 initial countries are located in Asia, the Americas, Europe, and Oceania (see **Table 1**). This paper focuses on 11 countries, namely Japan, Brazil, Costa Rica, Puerto Rico, Italy, Greece, Portugal, Spain, Hungary, Canada, and United States of America. Those selected countries have a long census history, whereby the majority of countries started to compile data on educational attainment after World War II. The listed countries represent different regions of the world as well as different paces and patterns of demographic transition (see **Figure 3**) and education transition from low to highly educated societies.

When it comes to the demographic transition from high- to low-mortality and fertility regimes, the majority of the 30 countries have achieved the last stage of the demographic transition and have attained low levels of fertility and mortality, while the rest of the countries are catching up fast. **Figure 3** illustrates the life expectancy (y-axis), TFR (x-axis), and population size (bubble size) by EDU20C countries and continent in 1900 (gray) & 2018 (colored bubbles). In 2018, the majority of the countries surpassed 70 years of average life expectancy at birth and are approaching or dropping beneath the replacement fertility level (TFR: 2.1), with countries like Guatemala (2.9), Philippines (2.9), Bolivia (2.8), Ecuador (2.4), Argentina (2.3), and Mexico (2.1) lagging behind. Nevertheless, there is a notable clustering in 2018 of the 11 countries according to the three visualized demographic characteristics compared to the scattered pattern in 1900 [45–47].

[1] For more information visit: www.edu20c.org

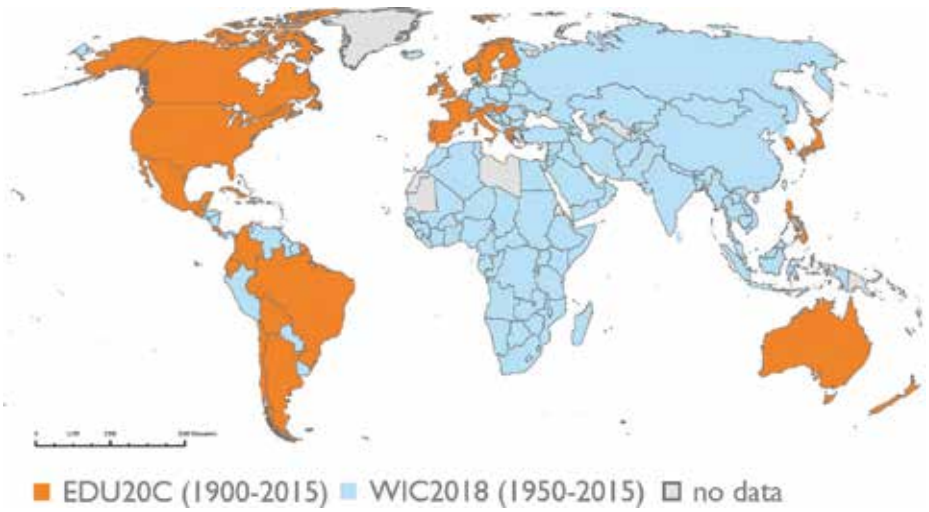

Figure 2. Geographical coverage of the WIC 2018 and EDU20C reconstructed data set.

Continent	Countries	LIT*	EDU**	Countries	LIT*	EDU**
Asia	Japan	NA	1960-2010	Rep. of Korea	NA	1966-2010
	Philippines	1903-1918	1990-2010			
Latin America	Argentina	1895-1960	1970-2011	Cuba	1899-1943	1953-2012
	Bolivia	NA	1950-2010	Ecuador	NA	1950-2010
	Brazil	NA	1940-2010	Guatemala	1921	1950-2012
	Chile	1907-1940	1952-2012	Mexico	1900-1940	1950-2010
	Costa Rica	1892-1927	1950-2010	Puerto Rico	1899-1940	1950-2010
	Colombia	1928-1938	1951-2005			
Europe	Austria	1900-1910	1951-2011	Ireland	1901-1911	1966-2011
	Finland	1900-1930	1940-2010	Italy	1901-1931	1951-2011
	France	1901-1954	1962-2011	Norway	NA	1950-2011
	Greece	1907-1928	1951-2011	Portugal	1900-1930	1940-2011
	Great Britain	1901	1971-2011	Spain	1900-1950	1960-2011
	Hungary	NA	1920-2011	Sweden	1930	1950-2011
North America	Canada	1901-1931	1941-2011	USA	1900-1930	1940-2010
Oceania	Australia	1911-1921	1966-2011	New Zealand	1901-1921	1961-2013

Table 1. Countries of study of EDU20C (colors referring to UN regions and 11 countries further elaborated upon in the study).

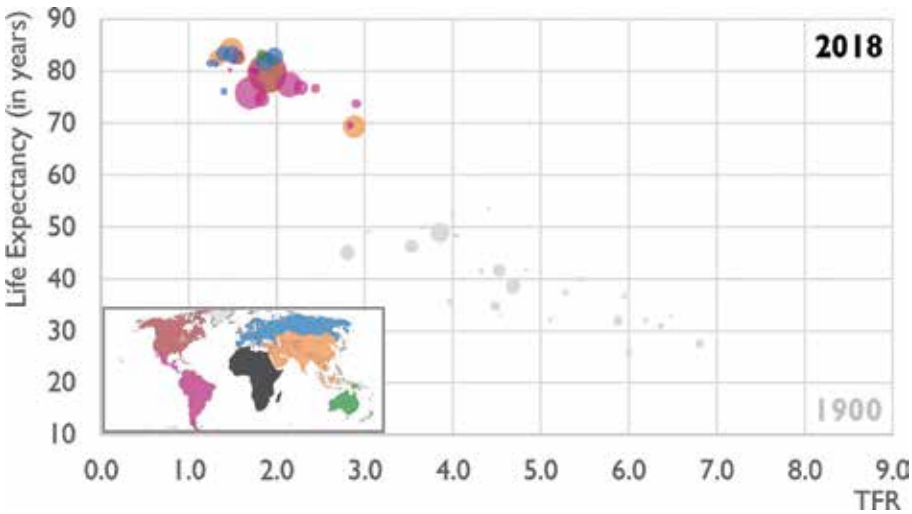

Figure 3. Life expectancy (y-axis), TFR (x-axis), and population size (bubble size) by EDU20C countries and continent in 1900 (gray) & 2018 (colored bubbles) ([45, 46], authors' illustration based on data from [47]).

Despite the availability of data and estimates on population size, fertility, and mortality in the twentieth century, the availability of data on education for the selected countries is limited. **Table 1** partially illustrates the gaps in the available data series. The preparation and processing of the collected data faces a number of challenges that revolve around the harmonization of educational categories, disaggregation and extensions of age structures (by education) and life tables as well as the filling of time series gaps, which are discussed in detail in Section 2.1.

2. Methodological approach

2.1. Challenges and estimation principles

The empirical data basis for the reconstruction is the collected, processed, and harmonized country-specific base-year data on educational attainment by age and sex from national educational classifications to the comparable ISCED categories (see **Table 2**). Furthermore, one major issue was concerning the availability of consistent age-sex-structures and life tables in 5-year steps for the entire reconstruction period, especially before 1950 as the United Nations (UN) provide this kind of data from 1950 onward [57, 58].

More than often, we had to decompose differently aggregated and varying open-ended age groups in the population age-sex-structures and life tables to retrieve consistent age groupings (5-year age groups from 0 to 100 years and higher) and to interpolate those for the entire reconstruction period. For instance, the basic information on the educational distribution by age and sex needed to be further processed to smoothen the educational distribution over age

ISCED 2011		ISCED 1997		[1900-1950]		[1950-2015]	
				-		WIC2012	
01	Early childhood development	-	-	x1	No Education	e1	No Education
02	Pre-primary	0	Pre-primary				
1	Primary	1	Primary	x2	Primary	e2	Incomplete Primary
						e3	Complete Primary
2	Lower Secondary	2	Lower Secondary	x3	Secondary	e4	Lower Secondary
3	Upper Secondary	3	Upper Secondary			e5	Upper Secondary
4	Post-secondary (non-tertiary)	4	Post-secondary (non-tertiary)	x4	Post-secondary	e6	Post-secondary
5	Short-cycle Tertiary	5B	First Stage Tertiary				
6	Bachelor's or equivalent	5A					
7	Master's or equivalent	5A					
8	Doctoral or equivalent	6	Second Stage Tertiary				

Table 2. The WIC educational attainment categories according to ISCED 1997 and 2011 classification (colors referring to education categories further used in the study).

groups, to convert irregular or aggregated age groups into 5-year age groups, to extend the highest open-ended age group with the usage of historical data-points to 100+ years, and/or to shift the input years to 0/5 round years (e.g., from 2011 to 2010).

While back to 1950, it was possible to use population age-sex-structures from the UN World Population Prospects (WPP 2017) and the data gaps before 1950 were increasing so that it became necessary to estimate intercensal population structures and life tables for many countries using an exponential interpolation by age groups to retrieve estimates for the missing years. **Table 3** illustrates the data preparation necessary to arrive at usable input for the reconstruction model.

2.2. Reconstruction principles

The reconstruction of past levels of educational attainment by age and sex relies on the basic principle that education is predominantly acquired at young ages, normally before the age of 25 years. Additionally, education is acquired unidirectional as an individual can only add skills and educational levels until it reaches the personal final or highest educational attainment level that becomes a fixed attribute for the remaining life. Therefore, the education of individuals can

Area	Estimations and adaptations
General	• Adaptation of available historical data to current border situations, with available estimates and historical regional records [3, 4] [EXCEL]
	• Harmonization of national education categories to ISCED [3, 4] [STATA]
Education	• Education distribution age smoothing and disaggregation using a smooth spline function [R]
	• Education distribution age extension using logarithmic extension of education distribution, historical cohort marker information, and smooth spline function [R]
	• Education distribution age shift to 0/5 round years following the age-specific education distribution pattern [R]
Life Table	• Life table age extension using a logistic extrapolation on the values for nqx, Lx, and ax for the last three age groups beneath the open-ended age group [R]
	• Life expectancy interpolation using a logistic function to at least two existing life expectancies at birth and sex, given the values of upper and lower asymptotes, based on E0LGST Spreadsheet [59] [R]
	• Life table interpolation using a function to interpolate the logarithms of the probabilities of dying (nqx) from two life tables using estimated life expectancies, based on INTPLTF/INTPLTM spreadsheet [59] [R]
Age-sex-structure	• Age disaggregation using the Karup-King formula [60–62] [R]
	• Age extension using the survivorship ratios (Sx) from the estimated life tables and using cohort splits [R]
	• Age interpolation using an exponential interpolation, which assumes a multiplicative relationship throughout the projection range, based on AGEINT spreadsheet [59] [R]

Table 3. Overview of used estimation procedures to create comprehensive and consistent input files.

be followed back in time along cohort lines, meaning that a 50-year old with a tertiary education in 2015, certainly had already acquired it in 2005 when he/she was 40 year old.

This reconstruction of educational level along cohort lines has limits, as some age groups are still undergoing major educational transitions. While most transitions happen before the age of 25 (age at which most people would have acquired a postsecondary education), still a substantial number of transitions are occurring at later ages. This is the reason why we developed educational matrices to model education transitions until the age of 34. We do not consider education categories below the age of 15 as this work concentrates on human capital measured by stocks of educational attainment in the population of working age.

Originally developed by Lutz et al. [13], the reconstruction methodology was extended to cover a longer timeline (back to 1900). The method, as in place today, can be described as **iterative multidimensional cohort component reconstruction model**. It relies on a given population by age, sex, and educational composition in a defined and available base year. As historical marker information, this method requires time-series data for the entire reconstruction period in 5-year steps on *population size* by age and sex, *mortality differentials* by education, and estimated *education transitions*, based on **educational attainment progression ratios (EAPR),** to reconstruct the historical changes in the educational distribution. Potential migration movements cannot be considered in the model itself, due to lack of comprehensive

Area	Reconstruction model elements
Model	• Iterative multidimensional cohort component reconstruction model [R]
Mortality	• Mortality differentials by education are expressed in terms of standard schedules in life expectancy at age 15 [5, 13, 51, 63], whereby the education-specific mortality differentials are converging along a logarithmic trend extrapolation to no differentials by 1950 [R]
Education	• Education transitions in the age groups 15–34 years based on the iterative back projection of EAPRs [R]
	• Collapse of the educational categories from 6 (1950 to base year) to 4 categories (before 1950)
Population	• Iterative adaptation of reconstructed education distributions by age and sex to the absolute population number by age and sex [R]
Projection	• As the reconstruction is based on the reconstruction from country-specific base years (i.e., 2015, 2010, or 2005), the population by age and sex has to be projected to 2015 to get consistent time series [5, 51] [R]

Table 4. Overview of required reconstruction model elements.

historical data of migration by education, but we adapt the model output according to the marker information, which implicitly handles the potential impacts of migration.

In total, the model requires three obligatory and one optional datasets for the base-year and/or the entire reconstruction period:

- Population by age (5-year age groups), sex and highest educational attainment for all 185 countries in the base year **(obligatory)**
- Population by age (5-year age groups) and sex for all 30 (185) countries from 1900 (1950) to 2010 in 5-year steps **(obligatory)**
- Life table by sex for all 30 (185) countries from 1900 (1950) to 2010 in 5-year steps **(obligatory)**
- Population by age (5-year age groups), sex, literacy, and/or highest educational attainment for all 30 (185) countries from 1900 (1950) to 2010 in 5-year steps **(optional)**

The reconstruction model itself consists of three major elements: mortality, education, and population. Furthermore, it is necessary to conduct a forward projection, based on the base year and reconstructed data, to retrieve with 2015 a consistent base year for all countries (see **Table 4**).

3. Results

The result of the described preworks and the reconstruction model itself is a dataset with the population by age, sex, and educational attainment for the selected countries from 1900 to 2015. This contributes to a better understanding of how countries shifted from relatively uneducated societies to higher educated societies in the course of the twentieth century due to comprehensive national education programs (i.e., compulsory schooling).

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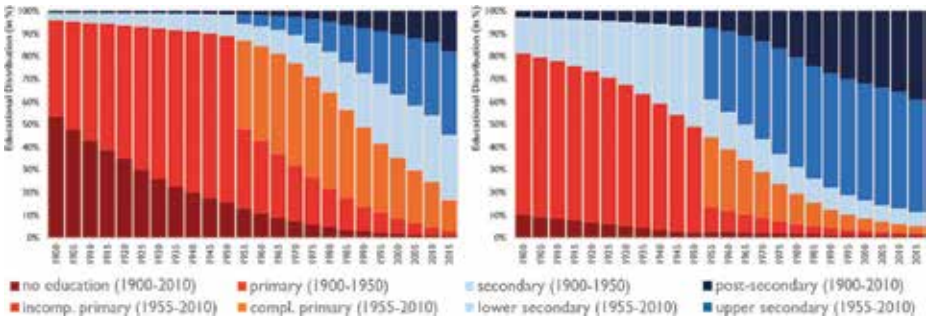

Figure 4. Share of total population aged 25 years and older by educational attainment in Italy (left panel) and United States (right panel), 1900–2015 (source: authors' calculations).

Figure 4 shows the example of how the educational composition of the total population aged 25 years and higher developed over time in Italy (left panel) and the United States (right panel). In Italy, the majority of population aged 25 years and higher in 1900 had either no education (53.4%) or primary education (42.5%). A law was passed in 1859 that made primary education compulsory with the general aim of increasing literacy. However, it was not enforced until 70 years later, particularly in rural areas. As a result, in 1955, there were still 48.2% with an incomplete primary education or less. From then onward, primary education has been decreasing again in favor of (lower and upper) secondary education as well as postsecondary education some years later. In the United States, laws to make education compulsory (most of the time up to age 16–18) were adopted by each federal states from 1852 onward. Implementation seems to have been more effective than in Italy although the share of the population who had neither incomplete nor complete primary education was above 50% until 1945, but it declined rapidly in favor of (lower and upper) secondary education. The share of the combined secondary education levels peaked with 60.2% in 1980 and 1985 before it started to slightly drop in favor of postsecondary education. The educational progress in both countries over time was driven by the gradual replacement of older less-educated cohorts with better-educated young population (see **Figure 4**).

The reconstructed data show when countries have reached certain benchmarks such as *universal primary education* [64, 65] or *universal lower secondary education* [5, 65–67]. **Universal primary education** is achieved when 95% of the population aged 30–34 years have at least primary education [64, 65]. This threshold has been reached by countries at different times. For instance, while countries like the United States (1965–1970) or Canada (1965–1970) reached this goal quite early, others like Brazil or Costa Rica still have relatively large segments of their population (mostly indigenous) who do not complete the full cycle of primary education.[2] In developed countries, the progress toward **universal lower secondary education**, which arguably can be considered as the compulsory level of education, is from relevance for policies aiming at labor force participation and economic development. Universal lower secondary is operationalized based on the literature as when more than 90% of the population in the age group 30–34 years has at least lower secondary education [5, 65–67].

[2] This is possibly the case in Japan and Hungary before 1950, although the primary education category, which aggregates incomplete and completed primary education, does not allow to state that firmly.

The timing of educational gains in at least lower secondary education is quite different among the selected EDU20C countries. While countries like the United States, Canada, and Japan showed already quite early in the twentieth century, a remarkable increase in the share of the population with at least a lower secondary education, others have been lagging behind, but catching up following different paces and trajectories. Countries like Hungary, Puerto Rico, Italy, or Spain showed a quite rapid increase between the 1950s and 1970s, while countries like Portugal, Brazil, or Costa Rica have been approaching slower. Among the selected countries, Hungary (1970), United States (1975), Japan (1975), and Canada (1980) have reached universal lower secondary first, while Portugal (2015: 88.9%), Brazil (2015: 75.1%), or Costa Rica (2015: 62.4%) are still below the threshold, but advancing fast (see **Figure 5**).

The improvement of the educational composition in the selected countries over time is also visible when looking at *mean years of schooling* (MYS), which is a widely used indicator to express the quantity of educational attainment in a single number [5, 68] (see **Figure 6**). The United States were kind of a frontrunner when it comes to educational progress, also in the mean years of schooling, as they showed a MYS of about 4.1 in 1900 and reached in 2015 about 12.1. Beside the United States, also Canada (12.5), Japan (12.1), Hungary (11.5), and Puerto Rico (11.0) from the selected EDU20C, countries surpassed 10 mean years of schooling. Others like Portugal (7.1), Costa Rica (7.4), or Brazil (7.4) are still lagging behind as the population still includes a very high share of less educated elderly. For instance, in 2015, about 67.2% of the Brazilian population aged 65 years and older had primary or less education. In those countries, it will need more time until the better-educated cohorts are finally replacing the less-educated ones.

An interesting feature is that the inertia of education was quite important for all countries, as lines do not cross very often, meaning that the pace of development in education seemed to be set quite early in educational history without abrupt changes.

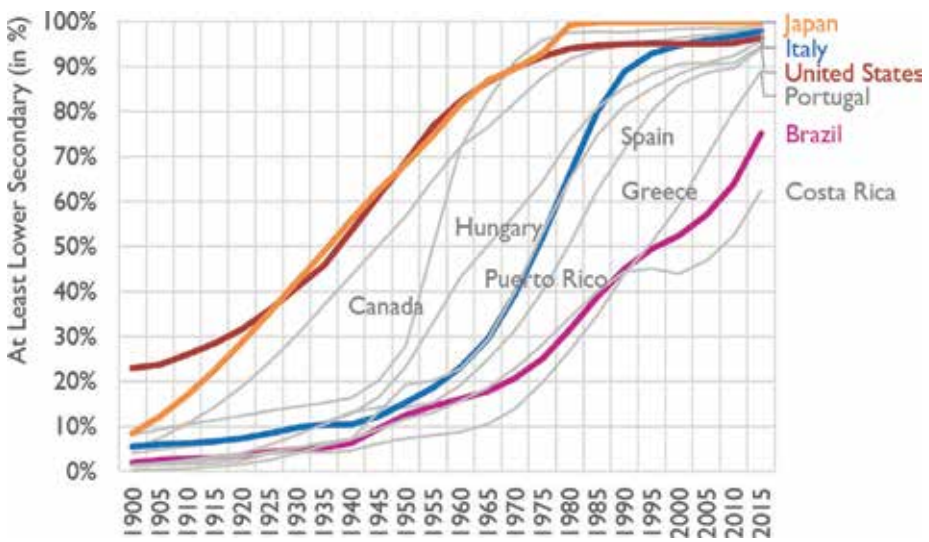

Figure 5. Share of population aged 30–34 years with at least lower secondary education by country, 1900–2015 (source: authors' calculations).

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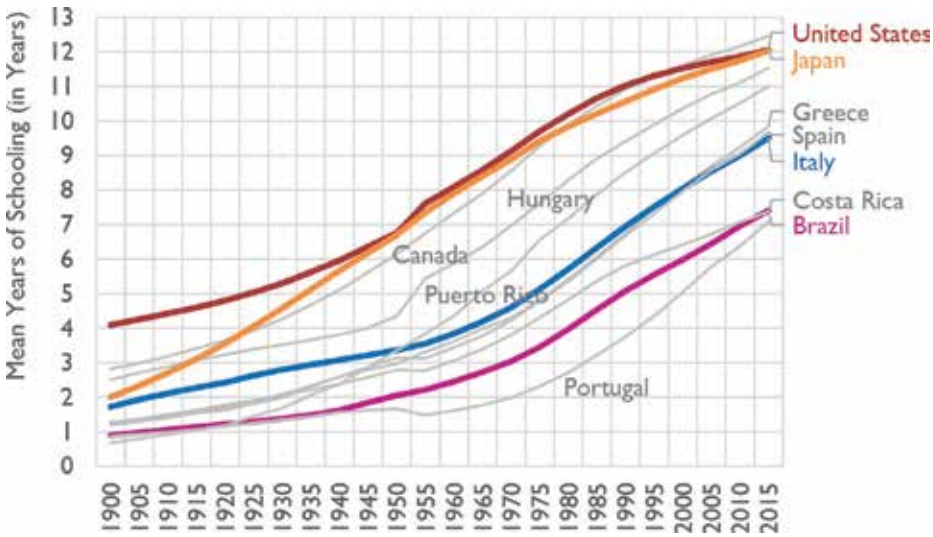

Figure 6. Mean years of schooling for total population aged 25 years and older by country, 1900–2015 (source: authors' calculations).

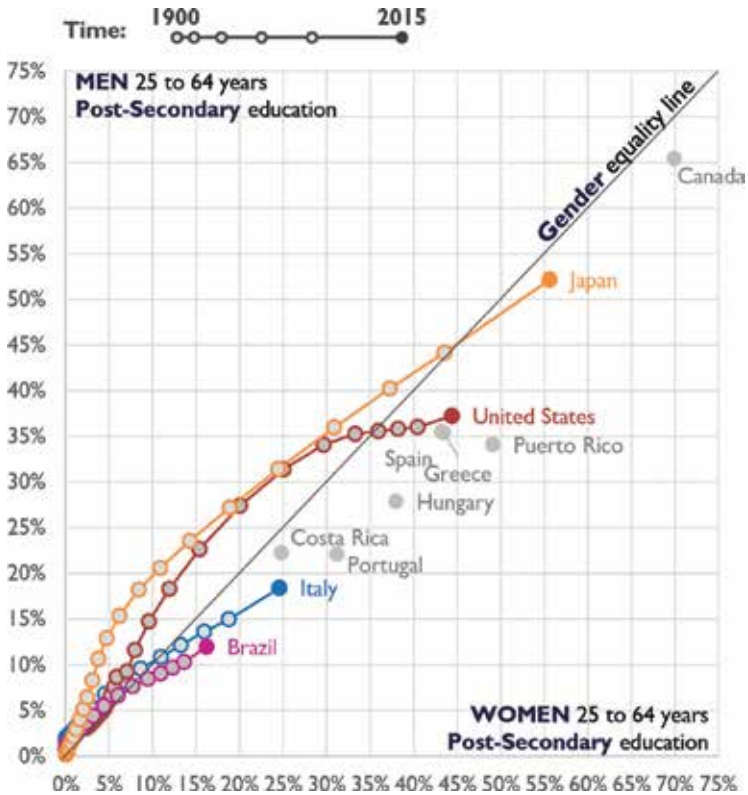

Figure 7. Share of population aged 25–64 years with postsecondary education by country and sex, 1900–2015 (source: authors' calculations).

If we concentrate on the educational progress of the population of working age (25–64 years) with postsecondary education, we see that the twentieth century witnessed a major shift in the participation of women in postsecondary education.

Figure 7 compares the changing shares of men (y-axis) and women (x-axis) with postsecondary education since 1900. Canada, Japan, and United States were frontrunners in increase in educational attainment. While men attained overall higher shares of postsecondary education compared to women (see **gender equality line**), whereby the gap has slowly diminished in many countries over the last decades. Most recently, this gender imbalance in postsecondary education has started to turn in favor of women. This phenomenon can be observed both at relatively low and high shares of postsecondary education in the population, i.e., in Brazil or Italy (low shares below 20% in 2015) vs. in Japan or USA (above 35% in 2015). The first of the selected countries to show a reverse in the gender imbalance of the population aged 25–64 years in favor of women was Puerto Rico (1980), followed by Portugal (1985) and Brazil (1990). The latest countries to experience this shift have been Japan (2015) and Canada (2010), the two countries showing the highest shares in postsecondary education for both sexes among all selected countries (see **Figure 7**).

The described process is driven by the cohort replacement of older less-educated cohorts with younger better-educated cohorts, which, when it comes to postsecondary education, are increasingly female. **Figure 8** shows the years in the reconstructed dataset when women surpassed men in their shares with postsecondary education at the age groups 25–34 years (gray) and 25–64 years (orange). Younger age cohorts that have gained wider access to postsecondary education mainly drive this reversal of the gender imbalance of the total population at working age 25–64 years. The frontrunners in the younger cohort (25–34 years) are Puerto Rico (1970), Portugal (1980), and Hungary (1980). From the selected EDU20C countries, Japan was in 2000 the last to show this shift in postsecondary education in the age group 25–34 years (see **Figure 8**).

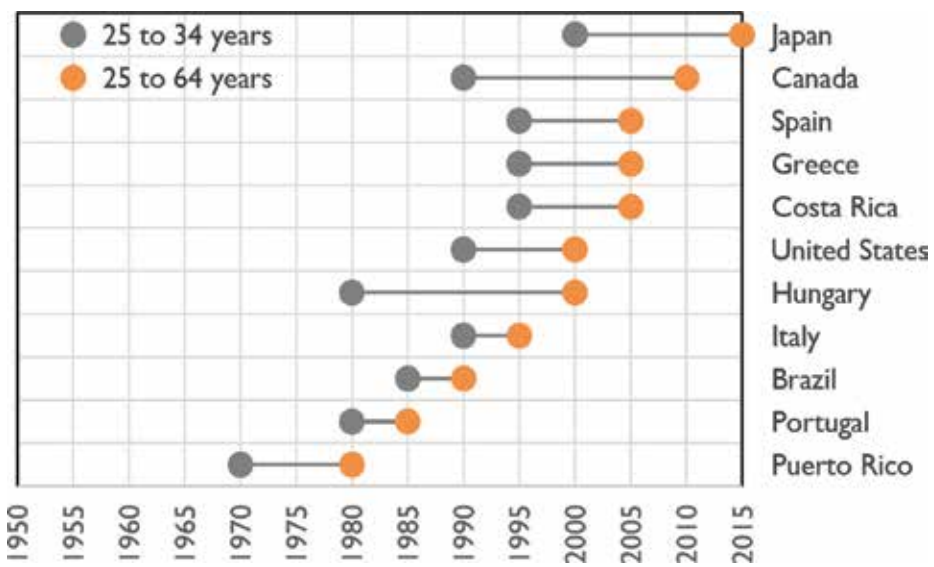

Figure 8. Years when gender imbalance in postsecondary education changed in favor of women for the age groups 25–34 years and 25–64 years, 1950–2015 (source: authors' calculations).

4. Conclusions

In the system theories of the sociology of education, investments in educational systems to increase attainment are determined by societal and economic agendas. The purpose of education systems is to evidently produce an eligible and productive workforce that has the potential to increase the national economic growth. The education system can be idealized as the medium that brings people from their primary embedment in a family system to an eligible position in the societal and economic structure of society, what inevitably creates a social stratification and societal classes. Depending on the theoretical framework, education either solidifies these class structures for the greater good to create a stable class equilibrium (i.e., structural functionalism) or enables the society to challenge those structures to initiate societal revolutions (i.e., conflict theory). The evolution of the role of education systems is connected with all kinds of political, societal, economic, technical, or industrial revolutions that challenged and redefined the roles of individuals in society. For instance, along with the third industrial revolution in the 1960s and 1970s, and the increased production and automatization due to the invention of computers and electronics, education had to redefine itself and had to create more specified education schemes in upper secondary and postsecondary education curricula. While facing the brink of the fourth industrial revolution in terms of Industry 4.0 due to Cyber-Physical Systems (CPS) and Internet of Things, the societies, labor markets and education systems all over the world will again face new challenges and transitions.

The model and dataset on population by age, sex, and education from 1900 to 2015 allows the decomposition of aspects and dynamic of education transition in terms of timing and pace. The dataset permits to follow countries through the diffusion of education along the continuum of education levels that happened with the implementation of compulsory schooling systems in the context of very diverse political regimes and in conjunction with the economic needs for a more educated and obedient labor force. While the connection between educational progress and socio-economic processes in societies are arguably linked, this dataset provides a profound basis to establish correlations among these and other processes, like demographic or technological revolutions.

Another finding of this research is the persistent existence of an education-specific gender imbalance with a changing direction of proliferation from a male- to a female-dominant educational structure, where women in higher shares than men attain postsecondary education. The question remains whether and how these increasingly higher shares of better-educated women will affect the socio-economic structure in those societies in terms of class stratification. The countries with the most progressive economic policies that integrate well-educated women in suitable labor market positions (e.g., Sweden) will increase their competitive advantage in the global economy.

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Appendices and nomenclature

a_x	**life table information:** average person-years lived in the interval by those dying in the interval [69]
EAPR	educational attainment progression ratio
EDU20C	education in the twentieth century project
IIASA	International Institute for Applied Systems Analysis
INED	Institut national d'études démographiques (engl.: Institute for Demography Studies)
INSEE	Institut national de la statistique et des études économiques (engl.: National Institute for Statistics and Economic Studies)
IPUMS	integrated public use microdata series
ISCED	International Standard Classification of Education
L_x	**life table information:** person-years lived between ages x and x + n [69]
ÖAW	Österreichische Akademie der Wissenschaften (engl.: Austrian Academy of Sciences)
${}_nq_x$	**life table information:** probability of dying between ages x and x + n [69]
S_x	**life table information:** survivorship ratio [69]
TFR	total fertility rate
UNESCO	United Nations Educational, Scientific and Cultural Organization
VID	Vienna Institute of Demography
WIC	Wittgenstein Centre for Demography and Global Human Capital
WPP	World Population Prospects
WU	Wirtschaftsuniversität Wien (engl.: Vienna University of Economics and Business)

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Chapter 4

Terror Attacks, Foreign Exchange Markets and Class Dynamics

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Additional information is available at the end of the chapter

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Abstract

This paper examines the effect of major terror attacks of the twenty-first century on the forex market. The "event study" methodology is used to assess whether, following a terror attack, the currency of the country attacked experienced a negative effect. It also examines whether this effect is permanent or transitory and whether there are differences between recent and earlier attacks. Results suggest that earlier events cause substantial negative "event-day" returns for the specific currency, which seem to persist for some days. This is particularly evident in pairs involving the currency of the country attacked and "safe heaven" currencies (e.g. Yen, Swiss Franc). The paper also documents that terror attacks that occurred recently appear to have very little influence on the currency pairs examined, thus suggesting that, over time, market participants have learnt to better assess such events. Given our findings, and particularly the one suggesting that the effects of terror attacks on the foreign exchange market, and hence the economy, are transitory, it would appear that class dynamics are not likely to be affected by them; forex markets appear to be particularly efficient in dealing with such events, absorbing short-term shocks and continuing to function effectively, thus maintaining economic stability.

Keywords: event-study methodology, terrorism, foreign exchange market, market reaction, class dynamics

1. Introduction

At a time when terror attacks have been making major headlines and shocking the whole free world, from Paris to London and from Brussels to Barcelona, many investors and other

market participants might be wondering how such events might impact the economies and the currencies of the countries or economic unions affected by such unfortunate events. By nature, terror attacks create uncertainty and reduce confidence, hence potentially leading to lower rates of investment, trade and eventually economic growth. According to [1], the estimated fall in US investment, due to terror threats, was about 0.2% of GDP. Obviously, such a fall in investment and thus income will most probably be transmitted to other economies, through lower US demand for imports. Moreover, it might be possible that such effects may also have implications for national and global class dynamics.

Reference [2] suggests that the economic costs of terror attacks can be divided into the following three categories: (a) direct economic damage inflicted by the attack, e.g. destruction of infrastructure and loss of productive lives; (b) cost of government response to terror acts, e.g. money spent on national defence and homeland security; and (c) costs related to the way people react to the fear of terrorism, e.g. the value of extra time spent waiting in line to pass through airport security. These various costs constitute a supply side shock to an economy and can potentially be very large.

According to [3], the indirect effects of terror attacks, that is to say changes in risk attitudes, transaction costs, demand, public finances and growth, may eventually outweigh the direct effects. It is moreover argued that the magnitude of the effects from such an attack is likely to depend on factors such as the nature of the attack, the type of policies adopted in response to the attack and, importantly, the resilience of the markets of the affected country or economic union. Such resilience can be quite significant when one considers the financial markets, as one of their key functions following such a shock is to 'digest' the information contained therein and efficiently incorporate it into prices. Reference [4] suggests that the initial effect of such an event could involve an overreaction from the market, but once the full set of information has been digested, markets tend to return to their pre-event levels.

Looking at it from a fundamental perspective, after an unexpected event such as a terror attack, financial markets and market participants, i.e. investors and market analysts, would need to reassess expectations related to the economy and how these may (or may not) be revised downwards. For example, because of a terror attack, there might be capital outflows from a specific country or a reduction of incoming visitors, thus lowering inflows of foreign exchange. In addition, market participants would also need to assess whether market risk premia increase, since terrorism involves greater uncertainty about the prospects of the economy. This assessment is likely to influence the actions of market participants and eventually the way financial markets react to the specific event, including the time they will require to 'bounce back'.

Motivated by the potentially negative effects of a terror attack on the economy of the country targeted, in this paper we aim to investigate the effects of major terror attacks that have occurred in the twenty-first century on the value of the currency of the country affected (i.e. the exchange rate). More specifically, we examine 11 attacks, which have occurred in the USA (two attacks), the UK (three attacks), France (two attacks), Spain (two attacks) and Belgium and Germany (one attack each). Therefore, the currencies examined are the US dollar (USD), the British Pound (GBP) and the euro, and their value is assessed—after the terror attack—versus one another, plus versus the Japanese yen (yen) and the Swiss franc (CHF). So, for example, after 9/11, the value of the USD will be assessed versus the euro, the GBP, the yen and the CHF and so on.

It should be noted that there are a number of papers that have examined the impact of terror attacks on stock markets (e.g. see [5–7]), but very few of them have examined whether the effect of terrorist attacks goes beyond stock markets to affect the foreign exchange markets too. Our paper, by focusing on the impact of terror attacks on exchange rates, aims to 'connect' with the existing literature and in doing so help to broaden the growing body of literature, which examines the effect of terror attacks on the economy and, in particular, the financial markets. Moreover, in light of our findings, our paper also aims to provide an initial discussion regarding how terrorism, through its effects on the foreign exchange market, could influence national and global class formation.

The rest of the paper is organised as follows: Section 2 presents an overview of existing literature and sets the research framework of this paper; Section 3 describes the data and the empirical method used; Section 4 presents and discusses our results; Section 5 concludes the paper.

2. Literature review

Literature for terrorism-related studies is not abundant, but work in this area has expanded significantly in recent time, given the increasing concern about terrorism in the world. The economic effects of terrorism have been analysed across various dimensions (an excellent survey may be found in [8]). It is our belief, however, that our paper is mostly related to two layers of literature: The first refers to the general economic impact of terror attacks, and the second one refers to the effect of terror attacks on markets (e.g. the stock market or the foreign exchange market).

Starting with the first layer, [9] identifies three possible channels through which terrorism may influence macroeconomic activity: through decreased insurance coverage, as a result of the perception of increased risk; through higher trade costs, possibly leading to lower levels of international transactions; and through greater security and defence spending. In [10] the economic impact on firms of terrorist attacks in the Basque Country, Spain, was examined, and it was documented that stocks of firms with a significant part of their business in that part of Spain showed a positive relative performance when truce was possible and a negative one when it was not. In addition, [11] examined the impact of terror attacks on foreign direct investment (FDI) and documented that countries that are being subjected to higher terror risk are associated with lower levels of FDI.

Reference [12] examines the economic consequences of terrorism and finds that the incidence of terrorism is negatively related to GDP growth. The study indicates that a terror attack in a country in a given year reduces its GDP growth by 0.57% points, on average. It moreover finds that the negative effect of terrorism on investment is matched by a positive effect on government spending, thus suggesting that terrorism redirects resources from investment to less socially enhancing government spending.

In [13] the impact of terrorism on the output of the Israeli economy is assessed, and it was found that an increase in terror attacks results in a decrease in investment, consumption and income in the long run. It moreover argues that, in this case, a government that acts optimally would increase the proportion of output spent on defence. Moreover, in [14], the effects of

terrorism on trade flows were examined, and it was found that countries subjected to terrorism trade less with each other. Moreover, it was documented that a 100% increase in the number of terrorist incidents reduces bilateral trade by about 4%.

In addition to the effects on the whole economy, there is also evidence in the literature that terror attacks are also associated with significant differential effects on different economic sectors. For example, given their specific vulnerability to terror attacks, tourism and airline demand have received special attention by researchers. The consensus points to a negative impact on both of these sectors (e.g. see [15–17] on tourism and [18, 19] on airline demand).

Moving now to the second layer of the literature survey which will focus on the effect of terror attacks on financial markets. In [7] the impact of 14 major terrorist/military events on the capital markets of the USA during the period 1915–2001 was examined. The first event was the torpedoing of the luxury ocean liner Louisiana on 7/5/1915, and the last one was 9/11. Moreover, the effect of two of these events, Iraq's invasion of Kuwait and 9/11, was examined in relation to other global capital markets too. It is documented that US capital markets are more resilient than in the past and recover sooner from terrorist attacks, in comparison to other global markets. According to the study, this can be partially explained by a more developed and stable US banking and financial sector, which is capable of providing liquidity, in order to maintain market stability.

In [20], the reaction of the world's financial markets after 9/11 was examined, and it was documented that a 'contagion effect' took place, that is to say an increase in the correlation between markets, as a result of both their strong interconnection and of the simultaneous flow of news. Moreover, in [21] specific cases where financial markets were directly or indirectly affected by terror attacks were examined (study focused on the reaction of markets to 9/11 and the attacks in Madrid in March 2004). The main finding was that financial markets were not only confronted with major disruptions caused by extensive damage to property and communication systems but also with high levels of uncertainty, especially in the case of 9/11.

In [5], the effect of terror attacks on the behaviour of the financial markets of six countries (Indonesia, Israel, Spain, Thailand, Turkey and the UK) is examined. It is documented that the magnitude of terrorism effects is greater in emerging markets than in more developed ones. In [6], the price reactions of major stock markets to terror attacks are compared, and it is concluded that such effects might be considered 'mildly negative', except for the case of 9/11. However, it is also argued that the impact of terror attacks is larger than those of comparable natural disasters, such as earthquakes.

The reaction of the FTSE 100 Index after 9/11, the Madrid bombings in 2004 and the London bombings in 2005 was studied in [22], and it was found that these attacks increased stock market uncertainty. Moreover, in [23] the effect of the same events was examined on the major US, European and Japanese stock markets, pointing out that over time, the size of the impact of the event and its duration has diminished. It is moreover argued that this might be due to two reasons: investors have overcome their initial 'overreaction' of 9/11 and more objectively measure the true economic

repercussion of a terror attack, and they have also become more accustomed to the terrorist threat, thus incorporating the associated risk more systematically into share prices.

The impact of terrorism on the behaviour of stock, bond and commodity markets is addressed in [24], which considers terrorist attacks that took place in 25 countries over an 11-year time period and concludes that most of the events led to a significant negative impact on at least one market under consideration. It moreover documents that the insurance and airline sectors tend to exhibit the highest vulnerability to terrorism, while the banking industry is the least sensitive. In [25] the 'event-study' methodology is used to examine the impact of the Madrid and London bombings on equity sectors. Significant negative abnormal returns were found to be widespread across most sectors in the Spanish markets, but not so in the case of London. Moreover, it is also documented that the time of recovery was much faster in the case of London.

In [26] the impact of the Boston bombings in 2013 on the financial markets of Frankfurt, London, Madrid, Paris, Milan, New York and Tokyo is examined, and its effects are compared to those of earlier terrorist attacks (9/11, 2004 bombings in Madrid, 2005 bombings in London). It is documented that the market indices exhibited statistically significant negative abnormal returns on the day of the event, but the magnitude of these abnormal returns was lower than the previous events. The effect of terrorist attacks on global capital markets was also examined in [27], and it was found that the economic consequences of terrorist attacks tend to 'spill over'. More specifically, it is documented that when a bigger economy is targeted, the 'spillover' is quite prominent for economically smaller trading partners.

Despite the growing number of studies examining the economic effects of terrorist attacks, the number of studies examining the impact of such attacks on exchange rates is rather limited. In [28], the effect of terror attacks on the stock and foreign exchange markets in Israel is examined. A number of terror attacks during the period 1990–2003 are considered, and it is documented that they had a significant effect on both the stock and foreign exchange markets. Nonetheless, it is argued that financial markets continued to function efficiently. Reference [29] examines whether terrorist attacks affect the exchange rates of 21 countries against the US dollar. It is found that the exchange rate returns of all countries are significantly affected by terror attacks. More specifically, it appears that terrorist attacks lead to the appreciation of some currencies and the depreciation of some others. Moreover, it is argued that as information on terror attacks becomes stale, its effect on exchange rates weakens but may persist after the attack.

This paper aims to enrich the limited literature related to the effect of terror attacks on exchange rates and by doing this contribute further to the growing body of literature that is related to the economic effects of terror attacks and more specifically their effect on the financial markets. It also aims to provide an initial discussion of how this effect might influence class dynamics. As such, in this paper we examine the impact of 11 major terrorist attacks that occurred in the twenty-first century on the behaviour of the exchange rates of the countries that were targeted by the attack. More specifically, we aim to provide answers to the following questions:

1. Did the specific attack affect the value of the currency of the country attacked versus other major currencies at all? (the currencies considered are the USD, the euro, the GBP, the yen and the CHF).

2. If yes, was the effect permanent or transitory? If permanent, how long did it last?
3. Did the response of the foreign exchange market to such events change over time? More specifically, do more recent terror attacks have the same effect as previous ones?
4. Given our results and the answers to the above questions, what is the possible effect of these attacks on the formation of national and global classes?

3. Data and methodology

According to the US government's Incident Review Panel Criteria, a terrorist incident is significant 'if it results in loss of life or serious injury of persons, major property damage, and/or is an act or attempted act that could reasonably be expected to create the conditions noted'. Given the aforementioned definition, the terror events selected for the purposes of this paper can be considered to be significant and, as such, may affect financial markets, including foreign exchange markets. We should note here that other papers that have addressed questions related to the effect of terror attacks on financial markets have built their samples of events in a way that best facilitates the examination of their research questions (e.g. see [7, 21, 23]). Along the same lines, it is our belief that the 11 events selected in this paper are adequate to address our research questions and provide a 'platform' upon which to discuss the effect of terror attacks on foreign exchange markets, as well as their potential effect towards class dynamics. The events selected are presented in **Table 1**, along with some useful information related to the events, such as who were the perpetrators, and what was the number of casualties.

Given that one of the aims of this paper is to discuss the effects that terror attacks may have on class dynamics, through the foreign exchange market, it is appropriate at this point to briefly focus on the ideological status of the above events, in other words, what kind of targets were attacked. All the above attacks were religious-driven and aimed targets such as the transportation system (airports, trains); public places (such as restaurants, theatres, etc.), including popular tourist locations; and of course 9/11, which through the attacks on the World Trade Center in New York and the Pentagon in Virginia, clearly targeted American economic and military power. Especially the attack on the World Trade Center can be thought to be an attack on a 'symbol' of international finance, which represents international payments, trade financing, international movements of capital, global stock markets and the determination of exchange rates, i.e. the foreign exchange market. International finance is also thought to be closely related to a so-called upper or elite class of people, who have at their disposal a lot of wealth and power. As such, 9/11 can also be thought to be an attack on this specific class. Apart from 9/11, the other targets examined are clearly 'soft targets', which unfortunately have been relatively easy to access. By doing this, terrorists are attacking normal people going to work, or going on holiday, and appear to aim at achieving objectives such as inflicting high casualties, hence scaring people, causing extensive damage to property and, importantly, undermining the way of life and the morale of national and international populations. It becomes apparent then that modern terrorist organisations use an anti-capitalist and anti-liberalism narrative to justify their actions, despite themselves operating within the capitalist sphere. Their targets of preference are 'symbols' of wealth-producing capitalist enterprises, and so an attack on them signifies the rejection of the Western financial paradigm. This condition does not prevent them, however, from engaging in capitalist ventures to fund their terrorist activities.

Country	Event	Date of event	Period of interest	Perpetrator group	Casualties (deaths)
USA	September 11 attacks	11/09/2001	8/5/2001–1/10/2001	Al-Qaida	7365 (2997)
Spain	Madrid train bombings	11/03/2004	6/11/2003–2031/3/2004	Abu Hafs al-Masri Brigades	>1800 (191)
UK	London bombings	07/07/2005	3/3/2005–2027/7/2005	Al-Qaida	784 (56)
USA	Boston marathon bombing	15/04/2013	10/12/2012–3/5/2013	Muslim extremists individuals	264 (3)
France	November 2015 Paris attacks	13/11/2015	13/7/2015–4/12/2015	ISIL	423 (137)
Belgium	2016 Brussels bombings	22/03/2016	17/11/2015–11/4/2016	ISIL	270 (35)
France	Nice 2016 attack	14/07/2016	10/3/2016–3/8/2016	Claimed by ISIL	433 (87)
Germany	Berlin 2016 attack	19/12/2016	15/8/2016–6/1/2017	ISIL	48 (13)
UK	London attack	22/03/2017	16/11/2016–11/4/2017	Muslim extremists	50 (6)
UK	Manchester bombing	22/05/2017	16/1/2017–9/6/2017	Muslim extremist	512 (23)
Spain	Barcelona 2017 attack	17/08/2017	13/4/2017–6/9/2017	Claimed by ISIL	>100 (16 + 8)

Source: Data for the first four events was obtained from Global Terrorism Database (http://www.start.umd.edu/gtd/). For the 2015, 2016 and 2017 events, data was collected from various media sources.

Note: Period of interest refers to the time period utilized both for the 'estimation' and 'event' windows.

Table 1. Events and background information.

The central hypotheses tested in this paper refer to the possible effect that the terror attacks mentioned above had on the currency of the country which suffered the attack. Towards this direction, we analyse this effect relative to other major global currencies and more specifically the USD, the euro, the yen, the GBP and the CHF. For instance, when analysing an event related to an attack in the USA, we examine the effect of this event on the USD relative to the euro, the yen, the GBP and the CHF. All data regarding these indices were collected from Forex Forum and are daily.

The relevant currency pairs were transformed into daily returns using the following equation:

$$R_{it} = \ln\left(\frac{P_{it}}{P_{it-1}}\right) \tag{1}$$

where

Rit are the daily returns of currency pair *i*.

Pit and *Pit-1* are the daily prices of currency pair *i* at time *t* and *t-1*.

The methodology employed in this paper is the 'event study' methodology. Event studies examine the potential effects of one or more events on the value of assets, such as stocks and bonds, commodities and, as in our case, currencies. The 'event study' methodology is based on the efficient market hypothesis (EMH), which according to [30] asserts that as new information arrives at the market, market participants immediately and accurately assess its current and future impact on prices. This assessment results in price changes, which reflect the effect of this new

information on the value of the asset under consideration. As such, significant price changes can be attributed to specific events, which resulted in the release of this new information.

On the basis of the above, it is no surprise that the 'event study' methodology has been broadly used to assess the impact of events such as earnings (e.g. see [31]) and mergers and acquisitions announcements (e.g. see [32]), regulatory changes (e.g. see [33]), the effect of macroeconomic announcements on the foreign exchange market (e.g. see [34]) and actions related to corporate social responsibility (e.g. see [35]). As far as terror attacks are concerned, there are also several papers that have used the 'event study' methodology to assess the effect of such attacks on stock markets (e.g. see [7, 21, 23]).

A general framework of the analysis that needs to be followed to carry out an 'event study' is provided in [36, 37]. Firstly, the date of the event needs to be determined; in this paper, this is defined as the day on which the specific terror attack took place. Next, to carry out the necessary time-series analysis, the 'estimation period' and the 'event period' need to be defined. In [36] it is pointed out that the 'estimation period' is the period that will be used to determine the estimated return predicted by the market, around the 'announcement date'. In this paper we will use a period of 90 trading days before the date of the event as our 'estimation period'.

The 'event period' is typically defined to be longer than the specific period of interest to accommodate the examination of periods around the event, thus capturing, where applicable, possible effects of insider trading as well as the longer-term effects of the specific event. Unfortunately, in the case of terror attacks, they cannot be foreseen, and as such, our analysis of their impact on the various currency pairs starts from the date of the event. Apart from the 'event date', 'event windows' of 5, 10 and 15 days after the event are also utilized to assess how quickly the market 'absorbed' (or did not 'absorb') the news. On the one hand, it is possible that on some occasions, initial worries might persist (e.g. of further attacks), hence keeping the exchange rate down, while, on the other hand, it is possible that uncertainties might be quickly eased through the release of new information (e.g. the government taking certain steps to 'comfort' markets), hence causing the exchange rate to recover.

To measure the reaction of the foreign exchange market to the announcement of a terror attack, an 'expected' or 'normalised' return for each currency pair employed must be estimated during the various 'event windows'. This 'normalised' return must then be subtracted from the actual return, Ri,t, observed on the day of the event and on subsequent days, in order to determine whether there is any abnormal return that might have been caused by the specific event.

This abnormal return is given by the following equation:

$$AR_{i,t} = R_{i,t} - E\left(R_{i,t}\right) \tag{2}$$

where

ARi,t = the abnormal (or excess) return of currency pair i at time t.

$E(Ri,t)$ = the expected or normalised return of currency pair i at time t.

An important element of the above equation is the estimation of $E(Ri,t)$, where in this paper we follow the methodology used in [7, 23] and compute $E(Ri,t)$ as follows:

$$E(R_{i,t}) = \frac{1}{90}\sum_{t=-90}^{-1} R_{i,t} \tag{3}$$

The date of the event is $t = 0$; hence the above equation estimates the expected return of currency pair i over 90 trading days, i.e. from $t = -90$ to $t = -1$.

One difference in this paper, relative to [7, 23] regarding the estimation of $E(Ri,t)$, is that we employ a relatively longer 'estimation window' (90 days, as opposed to 30 days in [7, 23]). The logic behind this is that we also use longer 'event windows' (up to 15 days), and therefore we also need to use a relatively longer 'estimation window'. Employing a longer 'event window' gives us the opportunity to better assess the possibility of transitory (vs. permanent) effects on currency pairs, over a longer period.

To examine the immediate reaction of the currency pair(s) to the specific event, the 'event-day' abnormal returns need to be examined. Nonetheless, to assess the effect over the next days or weeks, the cumulative abnormal returns (CAR) also need to be examined. It should be noted that CAR may provide a stronger and potentially more useful measure of the currency's resilience and ability to recover from the attack. As such, after the time series of abnormal returns has been established, it would be particularly interesting, and important, to test whether CAR are different from zero over the 'event windows' that span after the 'event day'.

Cumulative abnormal returns for currency pair i can be estimated using the following equation:

$$CAR_{(t1,t2)} = \sum_{t=t_1}^{t_2} AR_{it} \tag{4}$$

where $t1$ and $t2$ are the start and end of the 'event window', respectively.

Therefore, the null and alternative hypotheses for each event window can be defined as follows:

H0: $CAR_{(t1,t2)} = 0$ vs. H1: $CAR_{(t1,t2)} \neq 0$.

We will be examining each of the 11 events separately, and as such, we will need to carry out standard t-tests for each event and for each 'event window', within the specific event.

The relevant t-statistic is.

$$t - statistic = \frac{CAR_{(t1,t2)}}{\sqrt{L\,\sigma^2(AR_t)}} \tag{5}$$

where

$\sigma^2(AR_t)$ is the variance of the one-period average abnormal return over the 'estimation window'.

L is the number of days corresponding to each 'event window', i.e. the CAR will have a higher variance the longer is L (i.e. the bigger is the 'event window').

Effectively, the question being addressed here is whether, given the effect of the terror attack, the abnormal returns of the relevant currency pair are significantly different from zero on

the day of the event and the cumulative abnormal returns are significant during the various subsequent 'event windows'. This will in turn help provide answers regarding our research questions, which focus on whether terror attacks affect and to what extent global currency markets and potentially national and global class dynamics.

4. Results

In this section, we proceed with the presentation of our results where, regarding each event, we present t-tests for the abnormal returns of the relevant currency pairs, on the day of the event and for the CAR in 'event windows' consisting of 5, 10, and 15 days. Our first event is 9/11, i.e. the four attacks on the USA in the morning of 11/9/2001 when two planes crashed on the World Trade Center, one into the Pentagon and another one in Pennsylvania. The USA had seen terror attacks before (e.g. Oklahoma, 1995; New York, 1975), but the scale of this one was unparalleled. The perpetrators were Al-Qaida, and the attack killed 2997 people, injuring many more and causing huge losses in property and infrastructure. Moreover, the attack had other significant indirect effects, such as the employment of substantial Federal emergency funds to cover heightened airport security, the introduction of sky marshals, government takeover of airport security and the cost of military operations in Afghanistan.

As can be seen from **Table 2**, on the day of the attack, the USD exhibited significant negative abnormal returns, i.e. depreciated against all four currencies examined (the biggest depreciation was vs. the CHF). From then onwards, negative CAR persisted for 5 days in the case of the yen and the euro and for 10 days in the case of the Swiss franc (reaching almost −5% on a cumulative basis). There is no evidence of any significant CAR in the 15-day 'event window'. It is worth to note here that previous work, which has focused on the effect of 9/11 on the stock exchange, such as [7] documented significant negative abnormal returns on the 'event day' and negative CAR for the 6 days that followed it. It also found that CAR, 11 days after the event, were statistically insignificant. [24] also documented significant abnormal returns on

	Event-day AR	**5-day CAR**	**10-day CAR**	**15-day CAR**
USD/Euro	−0.016298**	−0.027550*	−0.016634	−0.016687
T-statistic	*−2.436896*	*−1.842260*	*−0.786513*	*−0.644218*
USD/yen	−0.013459**	−0.028719**	−0.027811	−0.005296
T-statistic	*−2.131922*	*−2.034358*	*−1.393025*	*−0.216589*
USD/GBP	−0.011843	−0.004639	−0.001486	−0.011128
T-statistic	*−2.367117***	*−0.414660*	*−0.093917*	*−0.574266*
USD/CHF	−0.027558***	−0.048169***	−0.049692**	−0.036522
T-statistic	*−4.314637*	*−3.372736*	*−2.460291*	*−1.476383*

Note 1: ***significance at the 1%, **significance at the 5% level and *significance at the 10% level.

Note 2: Table presents t-tests for the 'event day' and 'event windows' of 5, 10 and 15 days (H0, CAR = 0; H1, CAR≠0); t-statistics in italics.

Table 2. 'Event-day' AR and 'event-window' CAR for the USD after 9/11.

	Event-day AR	5-day CAR	10-day CAR	15-day CAR
Euro/USD	0.005187	−0.004191	−0.017084	−0.006541
T-statistic	0.698183	−0.252272	−0.727124	−0.227327
Euro/yen	0.006802	−0.026944	−0.060380	−0.066985
T-statistic	1.082066	−1.916971	−3.037679***	−2.751574***
Euro/GBP	0.004510	−0.006186	−0.017963	−0.014488
T-statistic	1.229986	−0.754545	−1.549276	−1.020269
Euro/CHF	−0.004712	−0.008945	−0.017190	−0.011739
T-statistic	−2.011023**	−1.707278*	−2.319992**	−1.293578

Note 1: ***significance at the 1%, **significance at the 5% level and * significance at the 10% level.

Note 2: Table presents t-tests for the 'event day' and 'event windows' of 5, 10 and 15 days (H0, CAR = 0; H1, CAR≠0); t-statistics in italics.

Note 3: In the case of the euro/yen pair, CAR becomes statistically insignificant after day 35.

Table 3. 'Event-day' AR and 'event-window' CAR for the euro after the Madrid bombings in 2004.

the 'event date' and for the 6-day CAR. As such, and in line with the findings related to the US stock exchange, it seems that 9/11 affected the US dollar too, but the effect was not long-lived.

The second event examined is the attack on the Madrid commuter train system in March 2004. The perpetrators behind this attack, which resulted in the death of 191 people and injuries to 1800 others, were the Abu Hafs al-Masri Brigades. Spain had been on the receiving end of terror attacks before, especially by Basque Fatherland and Freedom (ETA) (e.g. Barcelona, 1987), but this attack was by far the worse in terms of casualties. Moreover, the attack had two important political repercussions: the first one was a change in government (the PP lost the forthcoming elections), and the second one was that Spain withdrew its troops from the war in Iraq.

The results depicted in **Table 3** are particularly interesting for three reasons: (a) There appears to be no significant effect whatsoever on the euro/USD and euro/GBP; (b) on the 'event day', the euro exhibits significant negative abnormal returns only versus the Swiss franc; (c) beyond the event day, the euro exhibits negative CAR versus the Swiss franc up to the 10-day 'event window' and versus the yen up to the 15-day 'event window' (reaching almost 7% on a cumulative basis). It seems that the market took some time to digest and assess the effects of this attack, probably due to the fact that immediately after the bombing, leaders of the PP governing party claimed evidence indicating that ETA was responsible for the bombings; Islamist responsibility would have had the opposite political effect, as it would have been seen as a consequence of the PP government taking Spain into the Iraq War, a policy extremely unpopular among the people of Spain. As in the case of 9/11, our results regarding this event appear to be aligned with previous work, which has focused on the effect of the attack on the stock market. More specifically, [24, 25] documented significant and rather lasting—but not permanent—CAR for this event.

The third event focuses on the bombings that took place in London in July 2005, when three bombs exploded aboard London underground trains along with a fourth one, which exploded on a bus. The perpetrators of this attack, which resulted in 56 people dying and 955 injured, were members of the Secret Organisation of Al-Qaeda in Europe. Britain had seen

	Event-day AR	5-day CAR	10-day CAR	15-day CAR
GBP/USD	−0.005330	0.005630	0.001201	0.009131
T-statistic	−1.126561	0.532147	0.080257	0.498283
GBP/euro	−0.008184**	−0.013467*	−0.028921**	−0.019585
T-statistic	−2.270231	−1.670697	−2.537006	−1.402744
GBP/yen	−0.007248*	0.000042	−0.001698	−0.001711
T-statistic	−1.765482	0.004583	−0.130816	−0.107580
GBP/CHF	−0.009913***	−0.009547	−0.024205**	−0.015055
T-statistic	−2.936683	−1.264904	−2.267566	−1.151603

Note 1: ***significance at the 1%, **significance at the 5% level and * significance at the 10% level.

Note 2: Table presents t-tests for the 'event day' and 'event windows' of 5, 10 and 15 days (H0, CAR = 0; H1, CAR ≠ 0); t-statistics in italics.

Table 4. 'Event-day' AR and 'event-window' CAR for the GBP after the London bombings in 2005.

terror attacks before, especially from the Irish Republican Army (IRA), but this was by far the worst attack it suffered since the bombing of the Pan Am Flight in Scotland in 1988.

As can be seen from **Table 4**, on the day of the event, the GBP exhibited significant depreciation against the euro, the yen, and the Swiss franc, but not against the US dollar. This effect appears to persist up to the 10-day event window for the euro (reaching almost −3% on a cumulative basis) and the Swiss franc (reaching almost 2.5% on a cumulative basis) and from there onwards seems to disappear. As such, it appears the GBP took some time to recover from this attack, at least against some currencies. This is somewhat in contrast to what was documented in [25] regarding the London stock market, which documented that the market was quick to recover after the attack.

Our results so far merit a comment regarding the significance of currency pairs involving the yen and the CHF. More specifically, in most of the cases of both 'event-day' abnormal returns or 'event-window' cumulative abnormal returns, the currency of the country that suffered the attack seems to depreciate versus these two currencies, thus suggesting that, following the aforementioned terror attacks, investors sought 'safe-haven' assets, such as the CHF and the yen. These two currencies tend to remain relatively stable in times of turmoil or crisis and hence 'defend' investments from the adverse impact of currency risk. This 'flight-to-safety' effect is clearly demonstrated in **Figure 1**.

The fourth event refers to the Boston marathon bombing in April 2013 when two bombs exploded during the marathon, resulting in three people being killed and more than 264 being injured. As can be observed from **Table 5** and **Figure 2**, the response of the USD to this attack is quite different from that to the 9/11 attack. More specifically, there does not appear to be any effect on the value of the dollar in terms of the euro, the GBP and the CHF, and there appears to be an 'event-day' effect only, in the case of the yen, which nonetheless is clearly not permanent.

The next seven events that are examined in this paper are more recent ones and have occurred between 2015 and 2017. These refer to the November 2015 Paris attacks, the March 2016 Brussels attacks, the July 2016 attack in Nice, the December 2016 attack in Berlin, the March 2017 attack in London, the May 2017 attack in Manchester and the August 2017 attack in Barcelona.

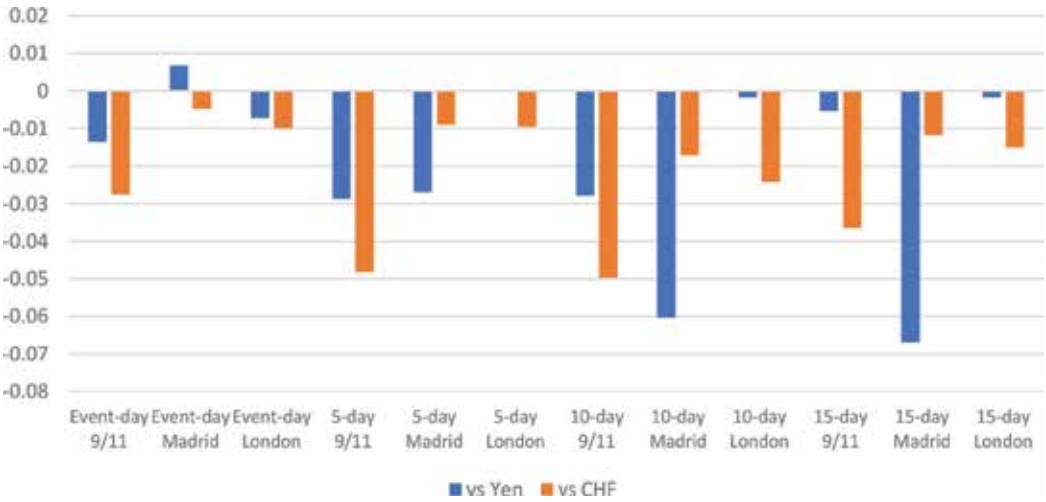

Figure 1. 'Event-day' AR and 'event-window' CAR for 9/11, Madrid 2004 and London 2005 (vs. the yen and the CHF).

The first event refers to the series of attacks that took place in Paris in November 2015, at cafés, restaurants and the Bataclan theatre, which resulted in 136 people losing their lives and 413 being injured. The Islamic State of Iraq and the Levant (ISIL) claimed responsibility for this, stating that it was carried out in retaliation for France's participation in the US-led coalition that carried out airstrikes in Iraq and Syria. France had experienced terror attacks before (e.g. by the Armed Islamic Group in 1995), but this was by far the deadliest one in terms of casualties. Due to this series of attacks, France was put under a state of emergency, borders were closed, and 1500 soldiers were deployed to help the police maintain order in Paris. The second event occurred a few months later and refers to the three suicide bombings which took place in Belgium in March 2016 (two at Brussels Airport and one at Maalbeek metro station), which resulted in 32 deaths and more than 300 injuries. The perpetrators were again members of ISIL, and the attacks were the worst terror incident Belgium ever faced. The targets chosen

	Event-day AR	**5-day CAR**	**10-day CAR**	**15-day CAR**
USD/euro	0.004970	0.004575	0.007089	0.001415
T-statistic	1.028086	0.423194	0.463755	0.075561
USD/yen	−0.016076**	−0.000347	−0.024752	−0.025447
T-statistic	−1.994523	−0.019276	−0.971109	−0.815156
USD/GBP	0.004084	0.005616	−0.013483	−0.020936
T-statistic	0.932575	0.573420	−0.973542	−1.234284
USD/CHF	0.003836	0.006165	0.016123	0.008819
T-statistic	0.850135	0.610931	1.129785	0.504570

Note 1: ***significance at the 1%, **significance at the 5% level and *significance at the 10% level.

Note 2: Table presents t-tests for the 'event day' and 'event windows' of 5, 10 and 15 days (H0, CAR = 0; H1, CAR≠0); t-statistics in italics.

Table 5. 'Event-day' AR and 'event-window' CAR for the USD after the Boston bombings in 2013.

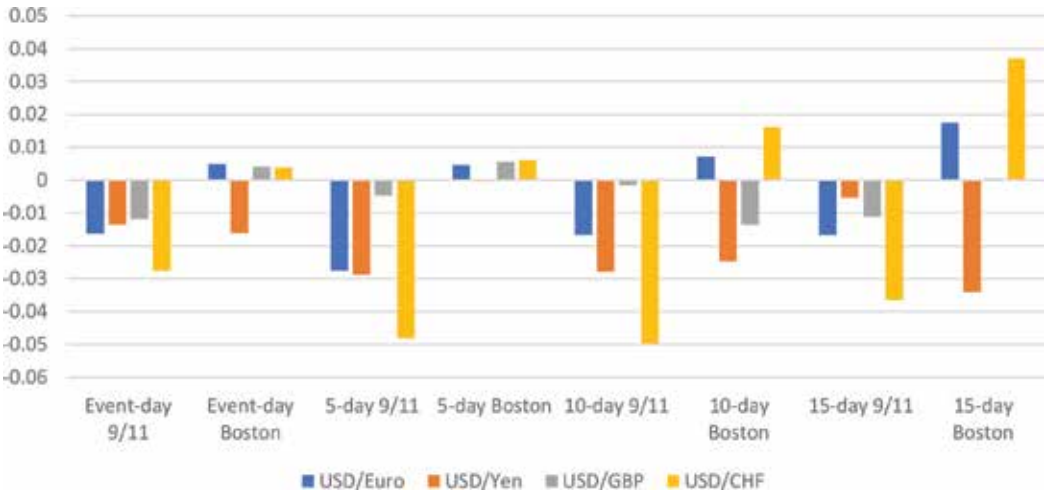

Figure 2. 'Event-day' AR and 'event-window' CAR for the USD; 9/11 vs. Boston Bombings.

this time were among the most sensitive in Europe, as Brussels is home to the EU, NATO and several international agencies.

The third event took place in France again and is the attack that took place in Nice in July 2016, when a large truck was driven into crowds celebrating Bastille Day. The attack resulted in 86 deaths and 434 injuries and once again, the ISIL claimed responsibility for it. The fourth event examined is the attack on a Christmas market in Berlin in December 2016, which cost the life to 12 people and left 56 injured. The perpetrator was a Tunisian failed asylum seeker, and ISIL yet again claimed responsibility for the attack. Germany had experienced terror attacks in the past (e.g. by PKK in Ulm in 1995), but this was the most severe in terms of casualties since the attack at Oktoberfest in Munich in 1980.

The fifth event is the London attack in March 2017 when a rental car was driven into pedestrians on London's Westminster Bridge; as a result of the attack, 4 people died and 50 more were injured. According to police sources, the perpetrator may have acted alone but could have been inspired by ISIL. The next event took place in the UK again, 2 months later, this time in Manchester, when a suicide-bomb exploded just outside Britain's Manchester Arena, as people were leaving a concert. Twenty-three people were killed in this attack and about five hundred were injured. It was the deadliest attack in the UK since the 2005 London bombings. The perpetrator was a British national of Libyan origin, and yet again, ISIL claimed responsibility for the attack.

The final event examined in this paper is the attack in Barcelona in August 2017 when a van was driven into pedestrians on the popular La Ramblas Avenue. As a result of the attack, 12 people lost their lives and another 130 were injured. A few hours after this incident, five men thought to be members of the same terrorist group drove into pedestrians in nearby tourist resort Cambrils, killing one person and injuring six others. The attacks were the deadliest in Spain since the 2004 Madrid train bombings, and it is believed that the ISIL was once again behind them.

With the exception of the attack in Berlin, where there is evidence of negative abnormal returns on the euro/yen pair on the day of the event only, all other recent events share one important characteristic; neither their 'event-day' abnormal returns nor their CAR over the 5-, 10- and

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15-day 'event windows' are statistically significant, for all currency pairs examined. This finding is particularly interesting and potentially important, as it clearly contrasts the findings related to earlier events, where, on the day of the event, there was clear evidence of statistically significant negative abnormal returns, which very often persisted for some currency pairs (especially those involving the yen and the CHF) in the subsequent event windows. **Table 6** depicts the 'event-day' abnormal returns for these seven events; results regarding subsequent event windows are not reported to preserve space but are available upon request.

The analysis carried out in this section provides important insights regarding the research questions addressed in this paper. The first question was whether specific terror attacks affect the value of the currency of the country attacked versus other major currencies. Our results seem to suggest that the former events appear to cause negative abnormal returns on the day of the event, i.e. a negative initial effect, on the currency of the affected country. This effect varies across currency pairs, for example, 9/11 resulted in a negative effect on the USD for all currency pairs analysed; the Madrid bombings in 2004 resulted in a negative effect on the euro only versus the Swiss franc; the London bombings in 2005 resulted in a negative effect on the GBP for all currency pairs analysed except the GBP/USD; the Boston bombings in 2013 resulted in a negative effect only on the USD/yen currency pair. These findings seem to be aligned, to some extent, with other work, which has focused on the effect of terror attacks on the stock market and which documents 'event-day' abnormal returns (e.g. see [23, 24]). It should be noted though that these studies do not cover more recent events, i.e. those that have occurred in 2015, 2016 and 2017. Our results regarding such events seem to suggest that the clear majority of these events do not seem to exert any significant negative effect on the value of the currency of the country affected, and this holds across all currency pairs analysed. Overall, it seems that financial markets have become less and less reactive to terrorist incidents in recent time.

The second question was whether the aforementioned effect on the currency was permanent or transitory. Again, there is a distinct difference between former and latter events; in the case of the former events, the effect, as highlighted by negative CAR, seems to persist for some days, at least for some currency pairs. In the case of 9/11, the most persistent effect appears to be for the USD/Swiss franc pair, which exhibits negative CAR in the 10-day event window. In the case of the Madrid bombings in 2004, the most persistent negative effect on the euro is related to the euro/yen pair (persists in the 15-day event window) and the euro/Swiss franc (persists in the 10-day event window), while in the case of the London bombings in 2005, the British Pound seems to exhibit negative CAR versus the euro and the Swiss franc in the 10-day event window. These results suggest that following the aforementioned terror attacks, demand for the so-called 'safe heaven' currencies, such as the yen and the CHF, increased versus the currency of the country that suffered the attack. As far as the latter events are concerned, in line with our finding related to the first question, there does not appear to be any persistent effect for any of the currency pairs analysed.

The third question addressed was whether the market response to such events has changed over time and more specifically whether more recent attacks affect currency markets in the same way as earlier ones. Results regarding this question seem quite interesting as they clearly indicate that recent events such as the Manchester bombing in May 2017 or the attack in Barcelona in August 2017, among others, did not seem to have any significant effect on the value of the currency of the country suffering the attack. This is clearly in contrast to earlier events, such as 9/11 or the Madrid and London bombings. One possible explanation for this is that some of the

Paris attack		**Brussels attack**		**Nice attack**		**Berlin attack**	
15/11/2017		22/03/2017		14/07/2017		19/12/2017	
Euro/USD	−0.00531	Euro/USD	−0.00328	Euro/USD	0.00217	Euro/USD	−0.00220
T-statistic	*−0.78455*	*T-statistic*	*−0.50166*	*T-statistic*	*−0.50166*	*T-statistic*	*−0.48742*
Euro/yen	−0.00093	Euro/yen	0.00229	Euro/yen	0.01282	Euro/yen	−0.01185**
T-statistic	*−0.18734*	*T-statistic*	*0.38239*	*T-statistic*	*1.34960*	*T-statistic*	*−2.42692*
Euro/GBP	−0.00399	Euro/GBP	0.00822	Euro/GBP	−0.01421	Euro/GBP	0.00380
T-statistic	*−0.62518*	*T-statistic*	*1.29038*	*T-statistic*	*−1.44827*	*T-statistic*	*0.66318*
Euro/CHF	−0.00349	Euro/CHF	0.00089	Euro/CHF	−0.00155	Euro/CHF	−0.00302
T-statistic	*−0.88635*	*T-statistic*	*0.29429*	*T-statistic*	*−0.52182*	*T-statistic*	*−1.25728*
London attack		Manchester attack		Barcelona attack			
22/03/2017		22/05/2017		17/08/2017			
GBP/USD	0.00036	GBP/USD	−0.00375	Euro/USD	−0.00392		
T-statistic	*0.05823*	*T-statistic*	*−0.61341*	*T-statistic*	*−0.86712*		
GBP/yen	−0.00753	GBP/yen	−0.00301	Euro/yen	−0.00623		
T-statistic	*−1.03914*	*T-statistic*	*−0.45512*	*T-statistic*	*−1.18227*		
GBP/euro	0.00149	GBP/euro	−0.00570	Euro/GBP	−0.00343		
T-statistic	*0.27798*	*T-statistic*	*−1.08205*	*T-statistic*	*−0.70862*		
GBP/CHF	−0.00209	GBP/CHF	−0.00296	Euro/CHF	−0.00473		
T-statistic	*−0.40796*	*T-statistic*	*−0.57692*	*T-statistic*	*−1.33436*		

Note 1: ***significance at the 1%, **significance at the 5% level and *significance at the 10% level.
Note 2: Table presents t-tests for the 'event-day' abnormal returns (H0, CAR = 0; H1, CAR ≠ 0); t-statistics in italics.

Table 6. Event-day abnormal returns for events that took place in 2015, 2016 and 2017.

earlier events, for example, 9/11, were much bigger in magnitude (e.g. many more casualties, higher direct and indirect costs, etc.) and, as such, naturally had a more profound effect on the foreign exchange market. Nonetheless, our results indicate that this is not always the case, for example, the attack in Paris in November 2015 and in Nice in July 2016 caused more deaths than the attack in London in 2005, yet the market reaction was distinctly different.

There may also be two further explanations regarding the above finding; the first one has to do with market participants, who seem to have overcome their initial behaviour of 'overreacting' and are now evaluating the 'true' economic and financial consequences of a terror attack. Sadly, market participants have seen several terror attacks, and they know that markets tend to 'bounce back' rather quickly, and this holds even for attacks as big as 9/11. The second explanation could be that, because market participants have become more used to the risk of terrorism, they are 'pricing' it in asset and currency prices much better; remember, the theory of market efficiency argues that unexpected events only affect markets. For example, consider the recent attack in Manchester (23/05/2017); it is possible that people in the UK, and that includes market participants, were expecting an attack to happen sometime. After all, we need to keep in mind that at the time of the attack, the threat level in the UK was classified as 'severe', which means that an attack was highly likely.

There is probably a different dimension to the above discussion, which is related to the theory developed in Ref.s [10, 28], which points out that it is the persistence of the terrorist phenomenon and no single attacks, no matter how big they are, that are likely to have a long-lasting effect on markets. Our results seem to suggest that market participants could be viewing the latter events as 'one-off' events, which are not likely to reoccur frequently. Nonetheless, given the unfortunate fact that lately we are seeing increasingly more and more terror attacks, it is possible that market participants may, at some point in time, re-evaluate their reaction to such events. This would most certainly be a very interesting field for future research, if and when more data is available (we most certainly hope it will not).

Turning now to the fourth and final question addressed in this paper, which was whether the above results regarding the effect of terror attacks on foreign exchange markets may influence national and global classes. This can potentially be done through the channel of the economy of the country suffering the attack, i.e. the effect to be transmitted from the foreign exchange market to the broader economy and potentially then to class dynamics. Our results indicate that earlier events have indeed affected the currency of the country attacked by causing it to depreciate against other currencies, especially those considered to be 'safe heaven' currencies (Yen and Swiss franc); our results, however, also indicate that latter events did not have any effect on the currency of the country attacked.

Typically, currency depreciation leads to imports becoming more expensive and exports becoming cheaper, thus more attractive; this usually results in an improvement in the balance of payments of the country. It moreover might lead to higher inflation (imported goods become more expensive), which in turn is likely to result in lower 'real wages'. Furthermore, a depreciation in the local currency is also likely to make the specific country a less attractive destination for foreign workers, but a more attractive one for tourists. Of course, when the currency of one country depreciates, the currency of another one (or more) appreciates; naturally, the economic consequences of a currency appreciation are the opposite to the ones mentioned above.

So, given the above, one might wonder what the effects of terror attacks, through the foreign exchange market, and its connection with the economy, might be on the class dynamics of nations, e.g. a permanent reduction in real wages could have serious implications for class dynamics. Nonetheless, an event such as a terror attack is likely to cause economic effects that will affect class dynamics, at the national and global levels, only if its effects on the currency—and hence the economy—are persistent, i.e. of a long-term nature. Our results clearly indicate that such events exhibit a transitory and not a persistent effect on currencies, for example, even an event of the proportions of 9/11 does not appear to have any negative effect on the US dollar for more than 10 days. Consequently, it appears that our results indicate that terror attacks are not likely to affect class dynamics, at least not through the foreign exchange market channel, which seems to be particularly efficient in absorbing short-term shocks, due to terror attacks, and continuing to function effectively, thus preserving economic stability.

5. Conclusion

This paper has employed the 'event-study' methodology to examine the effect that major terrorist attacks may have on the currency of the country, or economic union, which suffered the attack. It moreover provides an initial discussion regarding the possible effect that terror attacks might have, through the foreign exchange market and its link to the economy, on national and global class dynamics. More specifically, 11 major terrorist attacks that occurred in the twenty-first century were selected; two from US, two from France, two from Spain, three from Britain and one from each of Germany and Belgium, and an assessment was made to see whether these events resulted in significant negative abnormal returns for the currencies of these countries (versus other major currencies), on the day of the event and on the days that followed (we used 'event windows' of 5, 10 and 15 days).

Our results provide interesting insights regarding the way currency markets react to terror attacks over time. More specifically, except for the most recent attacks, i.e. those that occurred in 2015, 2016 and 2017, all others appear to cause substantial negative abnormal returns on the day of the attack. Moreover, in the case of earlier attacks (e.g. 9/11, Madrid and London bombings in 2004 and 2005, respectively), these abnormal returns seem to persist for some time after the event. This finding is especially evident in currency pairs involving the currency of the country that suffered the attack and 'safe heaven' currencies, such as the yen and the CHF, where the former depreciates and the latter appreciates, thus suggesting that after such an event, there might be a 'flight' of investors' money to these currencies. However, for most of the terror attacks analysed, even the earlier ones, negative CAR do not seem to persist for more than 15 days. As such, we may conclude that the nature of these events is transitory and not permanent.

Probably the most striking finding of our paper is that the terror attacks that occurred in 2015, 2016 and 2017 appear to have very little or, in most cases, no significant influence on any of the currency pairs examined. This finding is particularly interesting as it suggests that, over time, market participants have probably learnt to better assess such events and hence react more calmly and rationally to them. They moreover appear not to treat them as unexpected events likely to significantly affect the foreign exchange market anymore.

The results of this paper connect well with those of earlier studies, which have mostly focused on the effect of terror attacks on stock markets and which have documented that such events seem to negatively affect stock prices on the day of the event and, in some cases, in the next few days (e.g. see [7, 23]), but the effect is not permanent. Our results appear to also be aligned with the finding that stock markets seem to have become more resilient to terror attacks over time (e.g. see [23]).

To sum up, it appears that currency markets have learned that, unlike the human toll, the financial ramifications of a terrorist attack can be short-lived and are not likely to affect economies in the same way as, for example, a recession would. As such, markets and market participants have become more efficient in absorbing the shocks or disruptions caused upon them by such events, learnt from them and continue to perform their functions effectively. This has potential repercussions for the potential effect of terror attacks on national and global class dynamics, through the foreign exchange market. It is our belief that for such an event to influence the dynamics of class formation, it must first have a permanent effect on the economy of the country attacked, which, in turn, must be caused by a permanent effect on the foreign exchange market; our results seem to clearly suggest the opposite, thus indicating that terror attacks are not likely to affect class formation, at least not through the channel of the foreign exchange market.

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Stormy times are looming just around the corner during the next ten years. People all around the world are increasingly feeling that a major shake-up of our living conditions is in the air. The three most visible global dangers are an environmental collapse, a third world war, and an accelerating inequality of welfare between different parts of the human population. It is evident that these threatening developments are highly *interdependent* symptoms of the same social process: the dynamics of global political economy.

We are in acute need of a theory that explores our options for a surviving human species. The major social entities involved in this change have to be identified: Classes.

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