Lorenz Lassnigg (lassnigg@ihs.ac.at)

Stefan Vogtenhuber (vogten@ihs.ac.at)

Tracking, vocational education (VET) and the quality-inequality nexus – results about policy choices in structures of skills formation, Draft Oct.2016

1. Introduction and research questions

This paper reports about a wider study based on PIAAC data that explored the relationship of longer-term policies to the age-specific competence profiles in the population. [1] The purpose has been to contribute to an understanding of how the current competence levels and distributions in the population can be traced back to structural traits of education systems, and their change or persistence over the last decades during which the population has moved through schooling and higher education. Some merits and some caveats can be found by using the PIAAC data for this purpose. A merit, compared to most other data sets, is that the measured competences represent the whole skills formation process up to the stage of measurement. The different sectors of initial education, compulsory, vocational and tertiary, are included, which are otherwise mostly observed separately, and the more recent history/changes in education has been experienced by different cohorts in the population. Caveats are that the competences also reflect further ongoing learning not sufficiently documented in the data, and ageing effects, both interfering with the effects of education policies and structures. For the purpose of this exploratory study we assume both caveats not being very relevant because further education is strongly correlated with initial education, in particular tertiary education (Matthew effect), and pure ageing effects should be grossly similar across nations.

The research questions are focused to effects of educational structures and politics/policies concerning structures: first structural patterns of education systems are systematically classified, second relationships between these structures and competence levels and distributions are described, third the dynamics of timing of education policies and reforms in relation to competence formation is analysed. With respect to policies two important aspects can be illuminated by this research:

- first structural patterns of the mostly separately observed different sectors of education (basic-academic-vocational-tertiary) can be uncovered, in particular, how tracking structures interrelate with vocational and tertiary education; this concerns the viability of policy proposals that often take some element out of an overall pattern (e.g., vocational education, and currently in particular apprenticeships organized by the German type 'Dual System'), and want to implement it into another, without sufficiently understanding the interrelationships;

- secondly, the question of how broader policies translate into the overall process of formation of competences can be tackled in a systematic way by modeling the relationship of education policy time to the age specific patterns of competences; this can underline the long term dynamic of education policy that is often not sufficiently taken into account in the formation of politics.

The research strategy includes two different approaches, first a cross-sectional analysis of education structures and PIAAC competences, and second a more qualitative exploratory approach looking at the policy dynamic in selected countries. The cross-sectional analysis identifies structural patterns combining tracking, vocational education and tertiarisation and relates these patterns to the competences in literacy and numeracy levels (median or mean) and distribution (95/5 decile and 75/25 quartile ratios), comparing all countries of the first round and a group of advanced capitalist countries selected according to the Esping-Andersen typology of welfare regimes. The PISA tracking variables are taken as proxies for the education structures. The qualitative approach looks deeper into the reform histories and the age-specific competence profiles in nine countries/regions selected according to the different welfare regimes (liberal: Canada, UK/England, US; Nordic: Denmark, Finland, Sweden; continental: Austria, Germany, Netherlands).

2. Methodology

[1] Lassnigg, Lorenz; Vogtenhuber, Stefan (2014a), Das österreichische Modell der Formation von Kompetenzen im Vergleich, in: Statistik Austria (Hrsg.), Schlüsselkompetenzen von Erwachsenen – Vertiefende Analysen der PIAAC-Erhebung 2011/12, Statistik Austria, Wien, S. 49-79. Internet (in German): chapter: http://www.equi.at/dateien/lassnigg-vogtenhuber_2014_ko.pdf; Engl. Presentation http://www.equi.at/dateien/piaac-glasgow-pdf.pdf; detailed research report: http://www.equi.at/dateien/IHS-PIAAC.pdf

Overall, the approach of the analysis is quite simple and explorative, and needs corroboration by more sophisticated models by further steps. The results are to some degree against expectations, however, can also be justified by plausible arguments. So the analysis should inspire further work in this direction.[2]

2.1 The cross-sectional analysis

The rationale for the cross-sectional analysis is that most available studies about the effects of education structures do not pay attention to vocational education and that not much is known about the existing configurations of VET in a comparative perspective. The assessment of the competences of the population gives simultaneously information about the level and the distribution of competences, and can be related to the structures of education, which are expected to influence the distribution of educational opportunities. Two big questions are controversially processed in the political discourses since decades, first the alternative between secondary VET and tertiary education, and second the alternative between early tracked and comprehensive structures in lower secondary compulsory education; the two aspects are also interrelated, as more pronounced secondary VET is to some extent linked to tracked structures, and more pronounced tertiary education is to some extent linked to comprehensive structures.

The PIAAC data allow classifying the participating countries according to the longer-term persistent patterns of VET and tertiary education in the population. The aspect of tracking is further analysed by using the variables from PISA about the differentiation of education structures at the age of 15 and before. The main question of the cross-sectional analysis concerns how the structural traits are related to the level and distribution of competences. The Austrian structure as the starting point of the analysis combines early tracking at age 10 with a strong 'dualistic' VET system starting at age 15/16, and comprising apprenticeship and medium and upper level schools, the latter being linked to tertiary education. This structure is heavily criticized because of a high degree of social reproduction and a comparatively low level of tertiarisation and at the same time heavily praised because of the VET qualifications and the low level of youth unemployment. The comparison with the contrasting structures should give an estimation of how well the competence production might work in different education structures. The comparisons are made among two groups of countries/regions, all participating in PIAAC, and the selected countries.

Conceptually the degree of tracking is interpreted as an indication of meritocratic selectivity within an education system. From research about social selection in education structures it is widely known, that a more advanced social background basically provides better endowments for coping with the demands in the practices of assessment and selection, thus more and more early selection by and large increases social selection. In the political discourses competing beliefs about the patterns of selectivity are prevalent in relation to VET and higher education: one expects that an early selection between VET and general academic education would deprive those who choose VET from the broader opportunities to progress to academic pathways, the competing belief expects that the selection processes towards higher education would be driven very much by the meritocratic logic of school assessment practices; from both beliefs the students from lower strata would suffer.

The results are in some aspects at odds with the expectations. First, the degree of tertiarisation is not clearly related to competence levels. Second, tracking is much more widespread in comprehensive structures than expected, and much less clearly related to inequality of competences than widely assumed. In particular, the open tracked structures by school types does not indicate a higher degree of inequality compared to covertly tracked comprehensive structures. The cross-sectional results thus broadly support the meritocracy-thesis (Greinert 2005), saying that the increase of higher education would lead to an increase of selectivity in the school system, and would not necessarily support equality of opportunity. [3]

2.2. The retrospective qualitative approach

[2] The results of the analyses are described in a very detailed way in German language in the research report about this project, Lassnigg/Vogtenhuber 2014b.
Lassnigg, L. / Vogtenhuber, S. 2014b Das österreichische Modell der Formation von Kompetenzen im Vergleich. Auswertungen für den PIAAC-ExpertInnenbericht. IHS research report (May) . Vienna: IHS http://www.equi.at/dateien/IHS-PIAAC.pdf

[3] Greinert, Wolf-Dietrich (2005) Mass vocational education and training in Europe. Classical models of the 19th century and training in England, France and Germany during the first half of the 20th. Cedefop Panorama series 118. Luxembourg: Office for Official Publications of the European Communities.

The rationale for the qualitative analysis is inspired by the observation that the political sciences have widely neglected the politics and policies in education, and that therefore not much is known about how the current patterns of qualifications have been influenced by past policy making (Busemeyer/Trampusch 2011a).[4] A big gap exists between the 'education gospel', i.e. the high emphasis given to the potential contribution of education to solutions of various problems at societal and planetary levels and consequently the urgency of political action in this field on the one hand, and an understanding of how politics might have been able to influence education and its results.

Therefore an analytical framework has been used to trace the current levels and distributions of competences in the population measured by PIAAC back to the time periods during which the included cohorts have moved through the education system, and to relate stylized information about education politics and reform to the results shown by the PIAAC measurement. This approach would concern a wide array of countries during a fairly long period of more than five decades, and thus requires some decisions for selection. The study has departed from a focus on its regional origin in Austria, and its specific configuration of education including strong VET with apprenticeship as a collective skills system as a part of it. Austria is also a case of a small corporatist country (Katzenstein 1985)[5] and clearly belongs to the Continental conservative welfare model, thus Germany and the Netherlands as two other countries from this type have been included in the analysis, these three countries have also been included in the historical-institutionalist analysis of collective skills systems (Busemeyer/Trampusch 2011b).[6] As contrasting cases three Nordic countries (Denmark, Finland, and Sweden) have been included that are well known for the Social-democratic reforms of the 1960s, with Sweden as the paradigm case that has strongly influenced the political discourses in Austria and Germany. In addition Denmark is also included in the analysis of collective skills systems, and Finland has become an outstanding and widely discussed case in the 2000s because of its good results in the PISA-study.[7] Three countries/regions have been selected as contrasting cases from the liberal model, with the UK[8] and later the US being outstanding cases for the neoliberal New-Public-Management reforms from the 1980s onward. Canada was selected because of its high engagement in the PIAAC survey, and has also turned out also as the most tertiarised structure in the cross-sectional analysis of the PIAAC data.[9]

The analytic framework includes first a decomposition of the population by 5-years age-cohorts, traced back to the calendar time to display their year of birth and their flow through initial education periods; as already said, PIAAC does not include much information about further careers.[10] Attempts to use the sparse information about participation in adult education have shown a very high correlation with tertiary participation, and no signs of a substantial impact.[11] This combination of the age-cohorts with the calendar time allows for a compressed overview about the relationship of the education careers in the population and the education politics time, that plays in calendar time, and is in fact decoupled from the education careers. Time is mainly included in the political rationale by making strong statements about the future needs and threats, and partly by projecting models that in fact also seldom include reasoning about concrete expectations of how current politics might influence future outcomes.[12]

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[4] Busemeyer, Marius R.; Trampusch, Christine (2011). Review Article: Comparative Political Science and the Study of Education. British Journal of Political Science, 41, pp 413-443 doi:10.1017/S0007123410000517

[5] Katzenstein, P.J. (1985) Small States in World Markets. Industrial Policy in Europe. Cornell University Press.

[6] Busemeyer, Marius R.; Trampusch, Christine (eds.), The Political Economy of Collective Skill Formation, Oxford University Press, Oxford.

[7] PISA: Programme for International Student Assessment. https://www.oecd.org/pisa/

[8] The UK is represented in the PIAAC study by two of its regions/nations, England and Northern Ireland, and the results from England as the by far biggest part was taken for the comparison; to some extent these results must have been combined with aggregate figures about the UK as a whole.

[9] Among the Continental countries Switzerland would have been a very important case, however, did not participate in PIAAC; Belgium could also have been selected as a case in this type, however, only Flanders has participated in PIAAC. The selection of nine countries was made on terms of research economy; it is already difficult to gain oversight over such a high number of countries. To corroborate the results according to the typology, particularly in quantitative terms, Belgium, Norway, and Australia could be additionally added as a fourth country to each type (Belgium has been to some part observed).

[10] A more detailed documentation of education careers was intended in the early plans, however, has been abandoned in the further development of the study, at the expense of looking more intensely on the young cohorts; in the view of the authors this has been a severe mistake, because the young are already studied very much, and are not fully comparable because of their incomplete education careers, whereas very little information is available about the lifelong learning experience of adults, and what these experiences might add to the overall profile of competences.

[11] To the knowledge of the authors, it has also been difficult so far to find clear indications about effects of adult education in comparison to those of initial education, e.g. in the wide evaluation literature about labour market training, and also in some reviews about effects of further learning (Lit.). This topic would clearly need more research, however, seems not easy within the PIAAC information; some modeling could be tried, by including aggregate results about adult education participation by age groups into the analysis; this could not be done so far.

[12] The relating of the standard (economic) modelling to politics mostly includes (silent and implicit) assumptions about persisting relationships in the future, by some approaches theoretically underpinned (new growth theory that assumes scale effects; EC DG Empl 2006), however, often questionable (Toner 2011).

Secondly, a stylized pattern of education reform can be projected on the population like the annual rings of a tree, according to the time when certain age groups have moved through education. The first wave of social-democratic reforms of the 1960s was experienced by the older 50-to-64-years age groups, the second wave of the neo-liberal reforms of the 1980s by the young-to-mid-aged 25-to-39-years old age groups – in between the 40-to-49-year olds have gone through both, opposing reform periods, the egalitarian-collectivistic and the individualistic-competitive one (the youngest 16-to-25 age groups have not completed their education careers before the PIAAC measurement, and are thus not comparable to the older groups).

3. Results informing politics/policies

Four main results informing politics and policy making arise out of this research: the first two from the cross-sectional analysis, and further two from the retrospective qualitative approach.

3.1 Open and hidden tracking: comprehensive school structures often include tracking of students between classes

The structural patterns distinguish open tracking between different institutions/school types and covert or hidden tracking within comprehensive schools, with the first being related to vocational education, and the second being related to tertiarisation (a byproduct here is that the PISA-tracking variables that observe tracks within schools are misleading for openly tracked systems that mostly appear not tracked within schools).

The attempt to find typologies of education structures among the PIAAC participant countries shows much more mixed and diverse structures than widely being assumed in education policy discourses. Compulsory education cannot be reasonable described by a simple dichotomy of comprehensive vs. tracked structures, in particular because comprehensive school structures also widely track students into different classes by their more general achievement levels within formally alike schools. Because of the formal school structure this kind of tracking is not visible in statistics, as the schools have the same or similar naming, compared to the more traditional form of tracking that names the mass vs. elite school tracks differently, e.g. common school (Hauptschule) vs. Gymnasium. The latter are easily displayed by (the national) education statistics, and therefore named open tracking, whereas the former are not so easily visible, and because of a more blurred or diverse classification of students even not so easily measurable (e.g., in Austria the differentiation by achievement groups within the common school was never clearly documented by the education statistics); therefore the term covert or hidden tracking is used for this kind of structure. The de-tracking movement or discourse in the US during the 1980s (Loveless 2009, 2013),[13] as well as the more contemporary research about educational inequality (Shavit, Arum, Gamoran 2007, Lucas)[14] have pointed to these phenomena, also making the point that the more diverse naming of different tracks might pose problems of understanding particularly to disadvantaged groups).

The PISA data distinguish between different kinds of achievement grouping, and at an aggregate country or regional level, these variables can be used in combination with the PIAAC results. The more detailed tracking variables within schools at age 15 were observed by PISA through surveying the principals of tested schools.

Toner, Philip (2011). Workforce Skills and Innovation: An Overview of Major Themes in the Literature OECD Science, Technology and Industry Working Papers, 2011/01. Paris: OECD Publishing. http://dx.doi.org/10.1787/5kgkdgdkc8tl-en

EC DG for Employment, Social Affairs and Equal Opportunities (2006). Human Capital, Technology and Growth in the EU Member States, Kap.4 in Employment in Europe 2006 (S.173-201). Luxembourg: Office for Official Publications of the European Communities. http://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1031&context=intl

An example of such questionable projections by Woessman/Hanushek (OECD 2010); the literature about the 'Education Gospel' has tried to challenge this problem intellectually (Grubb Lazerson 2004). The economic forecasts should be in our view complemented by political forecasts, that take into account the long-term dynamic of education results in relation to the predominantly short-sighted timing of politics.

Grubb, W. Norton & Lazerson, Marvin (2004). The Education Gospel: The Economic Power of Schooling. Cambridge, Mass.: Harvard University Press.

OECD (2010) The High Cost of Low Educational Performance. THE LONG-RUN ECONOMIC IMPACT OF IMPROVING PISA OUTCOMES. Paris: OECD https://www.oecd.org/pisa/44417824.pdf

[13] Loveless, Tom (2013) The resurgence of ability grouping and persistence of tracking. Part II 2013 Brown Center Report on American Education, p12-20. Washington D.C.: Brookings.

Loveless, Tom (2009) Tracking and detracking. High achievers in Massachusetts middle schools. Research Report. Washington D.C., Thomas B.Fordham Institute.

[14] Lucas, Samuel R. (2001) Effectively Maintained Inequality: Education Transitions, Track Mobility, and Social Background Effects. American Journal of Sociology Vol. 106, No. 6 (May 2001), pp. 1642-1690.

Shavit, Y., Arum, R, Gamoran, Eds. (2007) A. Stratification in Higher Education. A Comparative Study. Stanford Univ.Press.

The analyses have used the variables from the PISA 2009 and 2012 survey that indicate the proportion of 15-year old students experiencing different versions of grouping by achievement within class or within school. Three variables are available in 2009 across all subjects and in 2012 only in math: (1) the proportion of students that undergo an exam for achievement-grouping, (2) the proportion of students in different classes within school according to achievement (2009 named 'streaming', 2012 ability grouping between classes), (3) the proportion of students according to ability grouping within classes. The analysis mainly uses the variable (2) about streaming, and Lassnigg/Vogtenhuber (2014b) display several different facets of these tracking structures. A summarizing picture is given in Fig.1 that shows the basic pattern of tracking within schools according to the PISA variables.

This analysis using the above mentioned PISA-variables (2) and (3) shows that a comprehensive structure does not mean abolition of tracking by achievement. Rather tracking takes another form. At age 15 a differentiation of pupils to groups within class ranges typically between 30% and 70% of the cohort, whereas a streaming differentiation of grouping between classes within schools is much more widespread in the Anglophone countries and Korea (ranging between 80% and almost 100%), than in the Nordic or Continental countries. The latter two welfare types widely overlap, with the Continental countries ranging between 10% and 60% of a cohort in tracked classes within schools, and the Nordic countries lying in a range between 15% and 40% of tracked students.

In the Liberal and the Nordic type this tracking occurs within comprehensive school and displays the whole degree of tracking, whereas in the Continental the PISA variables only cover the part of tracking that occurs within school. The other part occurs between different school types, and at age 15 the whole cohort is already affected by tracking in these countries/regions.

3.2 Open tracking structures by different schools types do not increase inequality and tertiarisation does not increase equality

In the political discourse the open tracking structures are heavily disputed, still according to the traditional equity-efficiency trade-off. This can be easily shown by looking at the political disputes between EU and international institutions like OECD towards Austria as a case of an openly tracked structure, in which the EU recommendations strongly stress the problem of social reproduction, and the OECD interpretations of statistics also point to this topic. However, more recent research also has stressed the other side of the coin, by showing marked signs of an erosion of the high societal emphasis on and support of the common school in the Nordic countries (Blossing, Imsen, Moos 2014). [15]

More recently two somewhat opposing phenomena came up in research, on the one hand the openly tracked systems are quite clearly related to a higher degree of social reproduction in educational participation and outcomes indicated by a strong influence of parental status on the education of the younger generation supported by this structure, on the other hand the relationship between educational inequality and more broader inequality in society indicated by income distributions is much looser than often implicitly assumed (Busemeyer 2015).[16] A missing link in this gap between seemingly opposing phenomena might be that the measurement of educational reproduction focuses on general and academic education, and thus leaves out the impact of VET which might play a contradictory moderating role. In-depth research in Austria can illustrate this, as two parallel paths of education careers and upward mobility exist in parallel, an easy-going reproductive path that can be called sponsored mobility from the higher strata through the early academic track to higher education, and a competitive path through the mass secondary track and the upper level VET schools/colleges also toward higher education. The contradictory quality of the second competitive path is indicated by a much higher degree of necessary effort indicated by a high degree of selectivity and drop-out.[17]

The cross-sectional relationship between tracking and educational results is analysed by three steps, (1) the aggregate correlation between tertiary education and competence results, (2) the relationship between tracking and the aggregate proportions of VET and tertiary education, (3) the two versions tracking related to the level

[15] Blossing, U., Imsen, G., Moos, L. Eds. (2014) The Nordic education model. 'A school for all' encounters neo-liberal policy. Dordrecht: Springer.
[16] Busemeyer, M.R. (2015). Skills and inequality: The political economy of education and training reforms in western welfare states, Cambridge University Press.
[17] An attempt to compare the distributional patterns of typical education structures has shown that the seemingly elitist Austrian structure does not result in an elitist pattern of outcomes, but rather in a compensatory or egalitarian pattern (Lassnigg 2015).
Lassnigg, Lorenz (2015) Das "österreichische Modell" der Bildungsungleichheit: Hohe soziale Reproduktion, starke Umverteilung, politische Polarisierung. IHS Sociological Series 109. http://irihs.ihs.ac.at/3817/1/rs109.pdf

and distribution of competences measured by PIAAC; always all participating countries and the selection of advanced countries are looked at.

(1) The proportion of tertiary education credentials was compared with the level and distribution of measured competences that against a widely held assumption (and against publications by the OECD) does not really indicate that expansion of tertiary education necessarily increases the stock of competences among all countries, and less so among the advanced group; the inequality of the distribution of competences is not related to tertiarisation in all countries, and by tendency increases in the advanced countries (more so in numeracy). In particular the three countries from the liberal welfare model (US, UK, CND), with a high proportion of tertiary education show in numeracy comparatively low levels and high inequality of competences (Fig.2a).

(2) The correlation of the amount of tracking with the respective proportion of VET and higher education shows clearly a negative relationship between tracking within schools and VET (R^2=.47), and a positive relationship of the amount of tracking with higher education (R^2=.23). If tracking within schools is interpreted as an indicator for the selectivity of structures, then this selectivity – against an intuitive assumption – is increasing with tertiarisation (Fig.2b).

(3) From widely held assumptions inequality of competences should increase with open selectivity, and – depending on opposing background ideologies about the role of achievement grouping – the level of achievement might increase or decrease with tracking. Empirically the literacy levels show less or no relationship to tracking, numeracy shows by trend a negative relationship, the comparison of the two versions of tracking gives a decrease of the relationship in both domains of achievement; that means that stronger selectivity would have less influence on achievement levels. In terms of inequality by trend more selectivity is increasing inequality, however, the relationship is stronger if only covert tracking is considered; the additional consideration of open tracking by different school types reduces the correlation with inequality (Fig 2c).

In sum, these results are clearly at odds with the widely held assumptions that an increase of tertiary participation would imply a decrease of educational inequality, and also indirectly corroborates the above result that tertiarisation does not necessarily increase the stock of competences, as the correlation of tertiarisation with the increasing selectivity might lessen the level of competences. The cross-sectional relationship between tracking and competence levels does not show a clear pattern, whereas in relation to inequality the open tracking structures are clearly *not* systematically related to more inequality than the hidden tracking in comprehensive systems; the increase of tertiary education vis-à-vis a high participation in VET does not reduce inequality, and the openly tracked VET systems seem to provide compensatory mechanisms that counteract negative effects of tracking on inequality (as a byproduct, the analysis also shows that the overall degree of tertiarisation does not increase aggregate competence levels., if outlying countries are taken into account).

3.3 Time dynamics of education reform

The modelling of the time dynamics of the competence formation process vis-à-vis education politics/policies shows the complex timing patterns (e.g., the five-years 60-65 PIAAC age group has experienced education and politics during approximately the mid-1950s till the late 1970s; or vice versa the politics of the 1980s have affected the four five-years PIAAC age-groups assessed between age 30 to 50). The populations covered by PIAAC measurement have experienced two waves of international education reform movements: first the comprehensive reforms of the 1960s linked to the increase of tertiary education and to democratization and equality, and second the standards and outcome oriented neoliberal New-Public-Management movement since the 1980s linked to individualization and quality. The older cohorts (50-64y) experienced only the first one, the young (25-39y) only the second one; and those in between (40-49y) have experienced both somewhat opposing periods.

This retrospective view should make clear, that the same complicated patterns also work into the future, and that current policies at certain stages necessarily will have restricted outcomes. A policy for the whole of education will not be possible, however, seems implicitly often prevail. A side effect of this time architecture can also be seen in the effects of the past experiences on the age-distributed teachers and administrators/managers as well as parents (e.g., certain age groups have experienced similar political movements and reform attempts, and have fought similar battles that might still influence perceptions). The old politics might have gone, even might be forgotten among policy makers (and also media people or journalists), but their effects might be more present than is perceived or expected. So the generations of policy makers might be quite differently formed than the generations of parents and teachers.

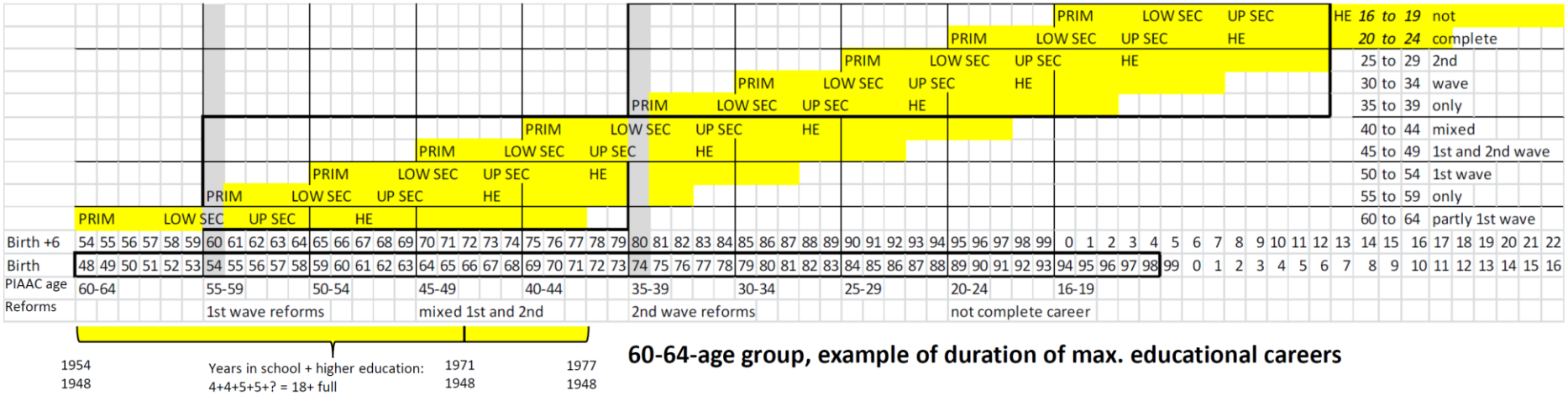
The attempt to map the basic structure of the time architecture of education politics shows the complicated interrelations between the political time and the career-flows through the educational institutions. If longer term effects of the educational experience are assumed, then it is not easy to locate the effects of past interventions in the population. In Austria for example the 1970s were a significant time of change and reform attempts; who in the current population has profited from it? Did these attempts that included additional resources have effects on the outcomes? Even if outcomes have been discovered in politics in the 1980s, also former interventions probably had outcomes, what where they? What can be learned from them? Are they lasting?

The display of the architecture shows the long time periods people are in education, so punctual interventions in early stages need much time to work out, and might also be countered by later interventions. This particularly applies for early education – that is not included in the architecture, but probably should be – which will be effective in employment after more than a decade. An interesting phenomenon can be seen in the age groups of the 40-to-49 old in the PIAAC assessment, who somehow experienced the two big to some extent opposing reform attempts of the 1960s and the 1980s.

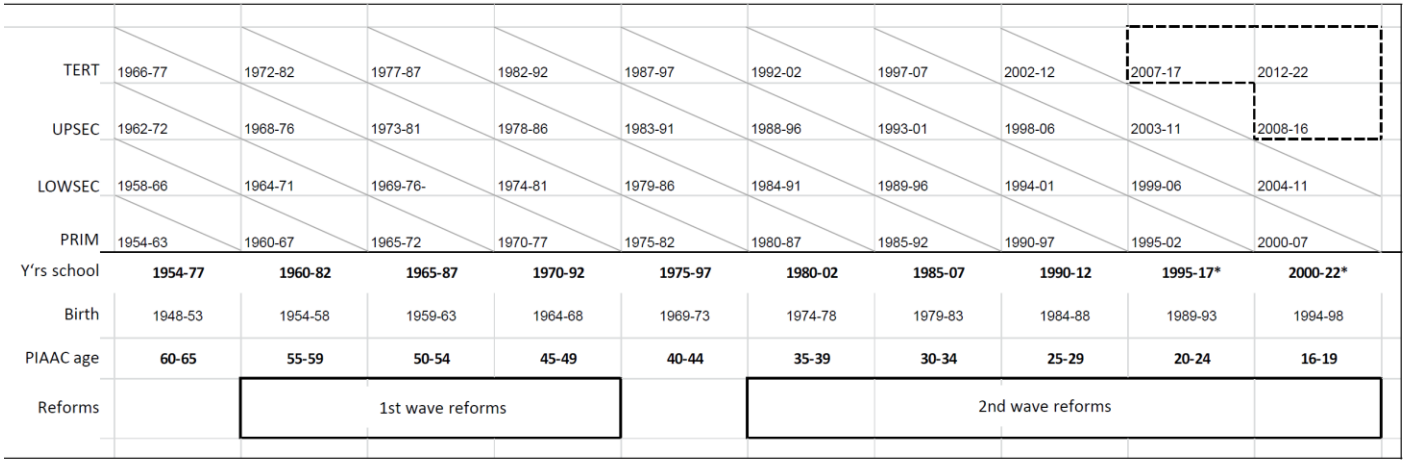
The recommendation from this exercise is that the time architecture should be deliberately considered in politics, similar to working out a plan, when building a house.

Box 1: Time architecture of politics in education. Tracing of age groups in population on calendar time of policy making

Flow of age groups through school and higher education by calendar time



60-64-age group, example of duration of max. educational careers



Political time and career-time of age groups,

overlap: between diagonal lines = similar political time

Periods of calender time

60-64 55-59 50-54 45-49 40-44 35-39 30-34 25-30 (20-24) (16-19)

Columns: age groups in PIAAC measurement

3.4. Welfare types and reform waves indicate different results: Liberal systems and current reform wave since the 1980s show comparatively worst results

The analysis of the reform history observes Finland as an exceptional case, that can hardly be taken as a benchmark, with a very consistent long term reform process starting in the 1960s, that was finished through the whole system shortly before its success in PISA 2000, and also did not follow the rules of the second reform movement; the age specific competence profile replicates the combination of increasing and highest competence levels and lowest inequality among the selected countries, however, the Nordic cases do not show a consistent pattern (e.g. Denmark shows mixed and medium level measures, and a much more mixed and contradictory reform history). On the other extreme the liberal systems of the US and UK/England, which are paradigmatic for the second reform wave show consistently the lowest levels and the highest inequality, whereas Canada rather lies near the average. The openly tracked continental cases that did not participate in the first reform wave also perform differently, the Netherlands show highest levels second to Finland and medium inequality, Austria and Germany lie at average level); taking into account VET those countries with more school-based VET perform better than Germany as the paradigmatic case of the dual apprenticeship system.

Fig.3 shows how the level of competences in literacy and numeracy is distributed among the 5-years-cohorts of the populations in the PIAAC study. The question is whether the different welfare regimes show different patterns. And the answer is: partly, however, with quite much diversity within the regimes. Nordic and Continental countries/regions show the best development in literacy, starting already in the time of the first reform period, and – with the exception of Finland – a trend towards leveling off later; however, each of those regimes includes also countries with less good development (DK, AT, DE). The liberal countries/regions perform less successful, with the US at many points at the bottom line, and without visible improvement with the second reform wave. In numeracy the liberal countries/regions are commonly at the bottom, whereas most other countries show quite similar improvement during the first reform wave. Finland continues the increase into the time of the second wave, and two continental countries/regions and DK perform better than most other selected countries. AT performs better in numeracy than in literacy.

Fig.4 shows the inequality in this time pattern. In literacy inequality goes down quite commonly, the US and UK show the highest but also diminishing values, AT in the early period, then FI and NL show the lowest and diminishing inequality. Inequality in numeracy shows a different and more mixed pattern with more diversity, and a tendency to increase in the middle age groups, beside a common tendency to diminish. The US display very high inequality in the earlier period, and CND is second in the earlier period but goes down later. Overall much up and down appears in many selected countries/regions.

Concerning the second reform wave a picture appears that it could not improve the level of competences so far, however, it seems also not to heighten inequality, as widely is feared.

4. Conclusions

Policy related conclusions are (1) that Finland is much too exceptional to be taken as benchmark, (2) that tracking increases inequality but tertiarisation does not reduce it, (3) overt tracking combined with VET does not increase inequality more than hidden tracking in comprehensive systems, (4) increasing tertiarisation seems to have backward effects towards increasing tracking and selectivity, (5) the current recipes of the second wave of reform do not produce encouraging results in terms of competence levels. Byproducts of the analysis are a better understanding of the PISA-tracking variables and the somewhat counterintuitive result that tertiarisation does not increase aggregate competence levels.

Vocational education at the upper secondary cycle, in particular work based and apprenticeship based systems, have gained much attention in global political discourses, as these provisions are meant to combine opportunities for the transition of young people into employment with an improvement of skills matching in the labour market. However, the provision of VET at this level is confronted with severe contradictions, as (i) the shift of participation towards tertiary education is related to a decline in secondary VET, and (ii) persistent VET systems are often related to openly tracked structures at the compulsory lower secondary level that creates inequality of opportunity among the young generation. Thus a political tendency towards comprehensive structures in compulsory education prevails that should open pathways towards tertiary education, and simultaneously postpones choices of VET programmes. As a consequence early access to VET is often perceived on the one hand as a structural trait limiting opportunities for educational careers, whereas on the other hand it might improve opportunities for at least certain groups of young people. Moreover, increasing

tertiarisation of educational participation is widely assumed to improve overall competence levels. Two competing interpretations exist about these structural trait of educations systems: one juxtaposing openly tracked vs. comprehensive structures against each other, postulating that comprehensive structures would substantially improve equality of opportunities and therefore tracked structures should be abolished to improve access to tertiary careers, VET tends to be seen as a second best alternative to academic education; the competing interpretation holds comprehensive education not a universal alternative but a solution that privileges a certain kind of academically biased school culture that leads to increased meritocratic competition without an overall improvement of competences, and at the same time impoverishes young people who do not cope well with this specific school culture. There is much fierce ideological controversy between these interpretations, however, not much empirical material because the VET discourse is strongly separated from the tracking discourse, and upper secondary education is not much covered by empirical data.

PIAAC gives us measures of the competences acquired through the whole education careers, including learning after leaving initial education. Thus the comparative data allow confronting national education structures with the levels and distributions of competences, at least in an explorative way. The analysis, based on a wider Austrian project, can report some empirical results stemming from the PIAAC competences on these contradictory issues that primarily show that the political alternatives and controversies are too much exaggerating the structural alternatives. Two points stand out:

- the tracked vs. comprehensive alternative is exaggerating the alternatives, as the comprehensive structures themselves include much tracking, the cross-sectional comparisons do not indicate stronger impacts on inequality of competences from openly tracked systems compared to the hidden tracked comprehensive systems;

- increased tertiary access does not overall improve aggregate competence levels, seems to increase the degree of hidden tracking in comprehensive systems, and does not clearly reduce inequality of competences.

In terms of policy choice the survival of early VET seems to be structurally related to open tracking, whereas tertiarisation seems to increase hidden tracking in comprehensive systems and to postpone VET that tends to become a second choice.

In our understanding the exploration has produced interesting results that should be corroborated by more causal-analytic modelling.

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ANNEX Figures

Fig.1: Tracking structures among PIAAC participating countries/regions according to PISA 2009

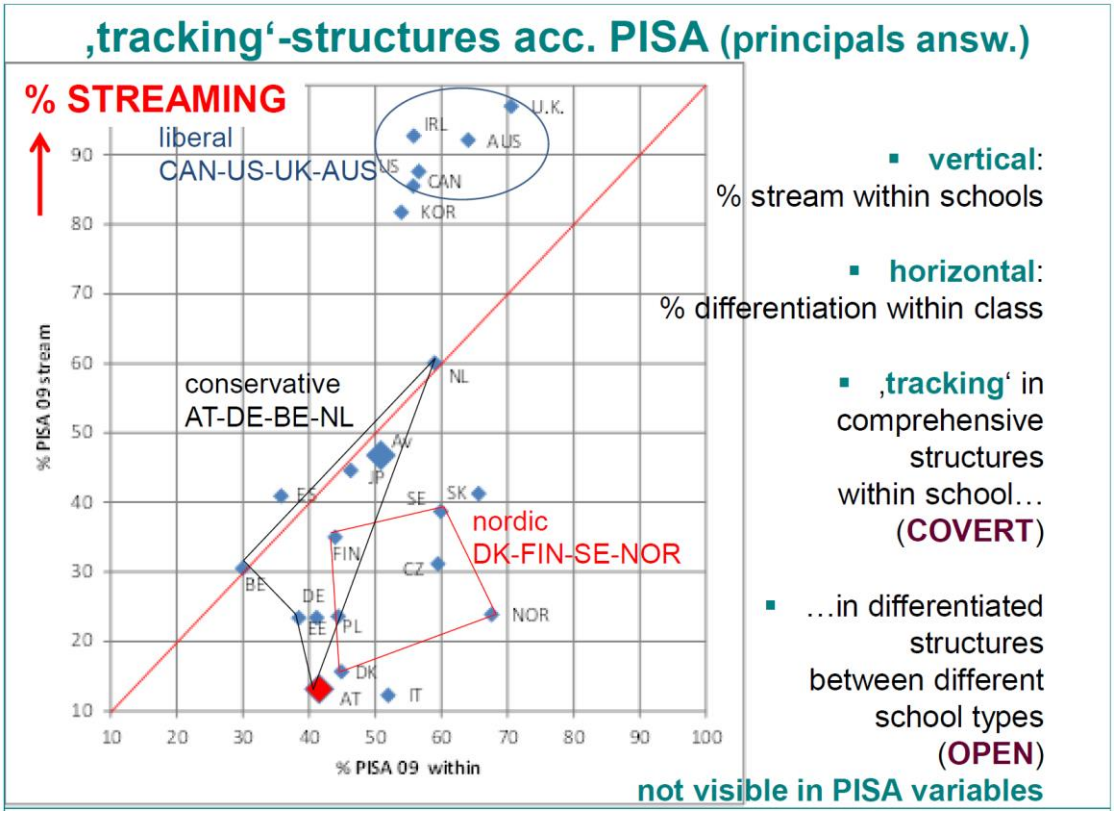
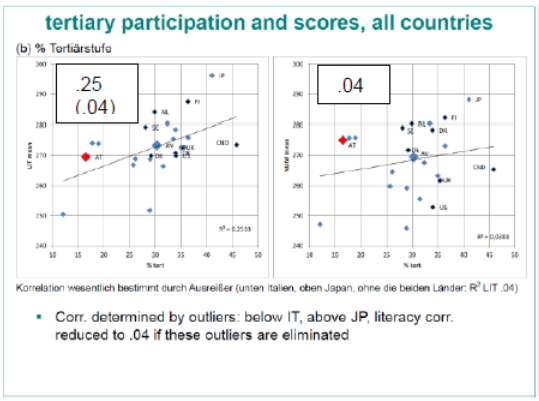
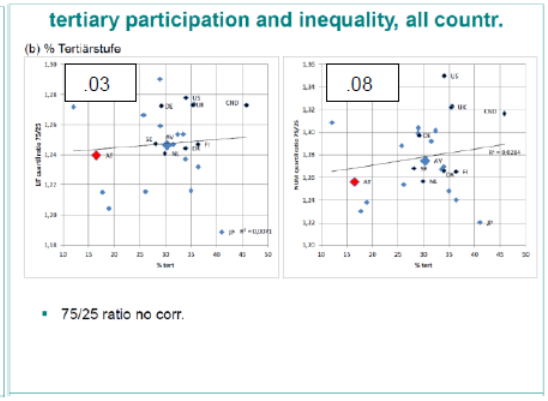
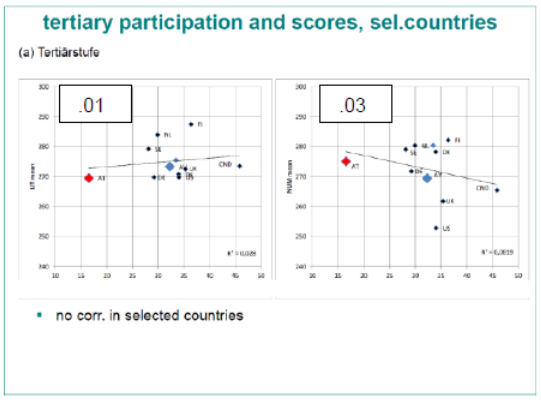


Fig.2a: Tertiary participation and competences scores and inequality, all and selected countries







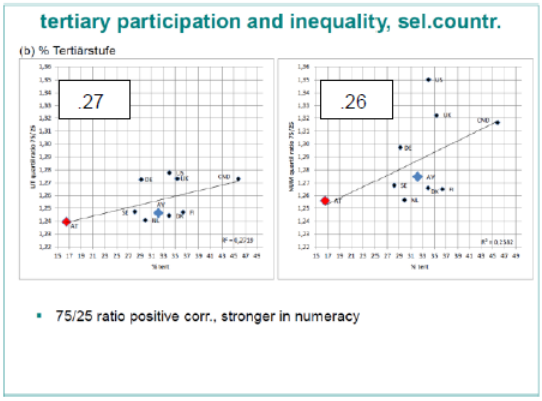


Fig.2b: Tracking within schools (PISA) and VET vs. tertiary participation, all countries

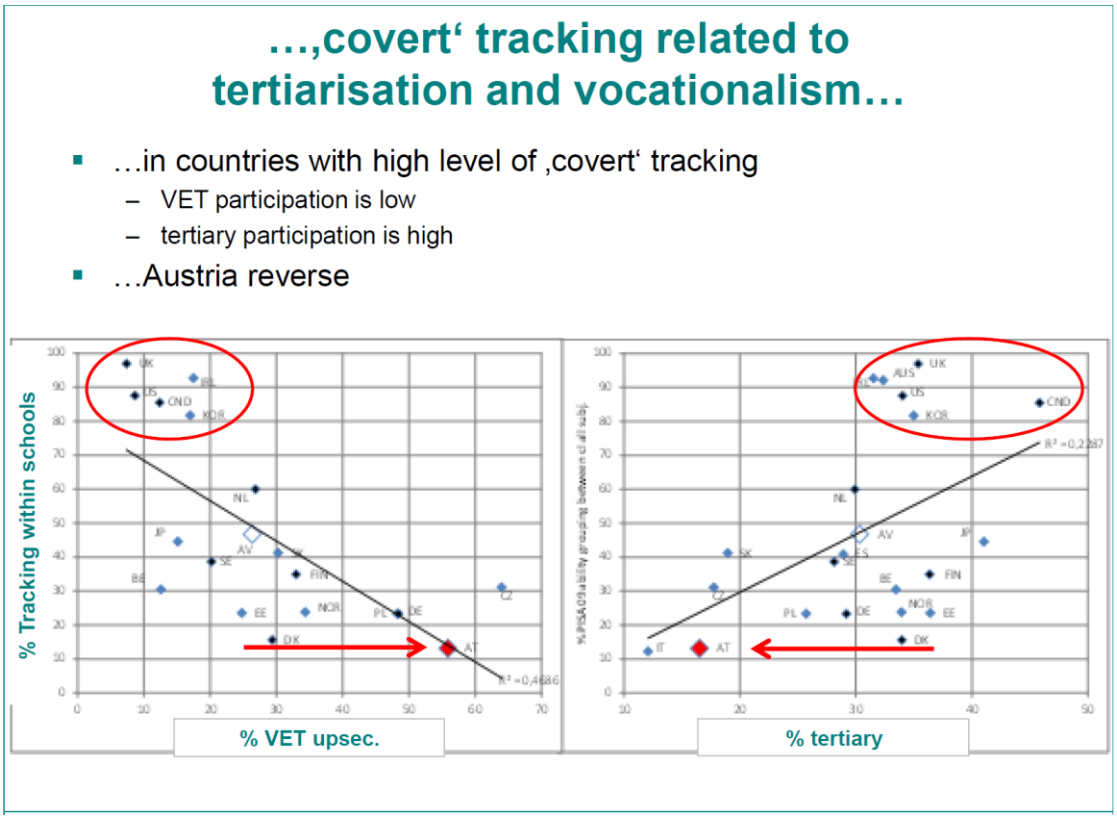


Fig.2c: Tracking and competences scores and inequality, all and selected countries

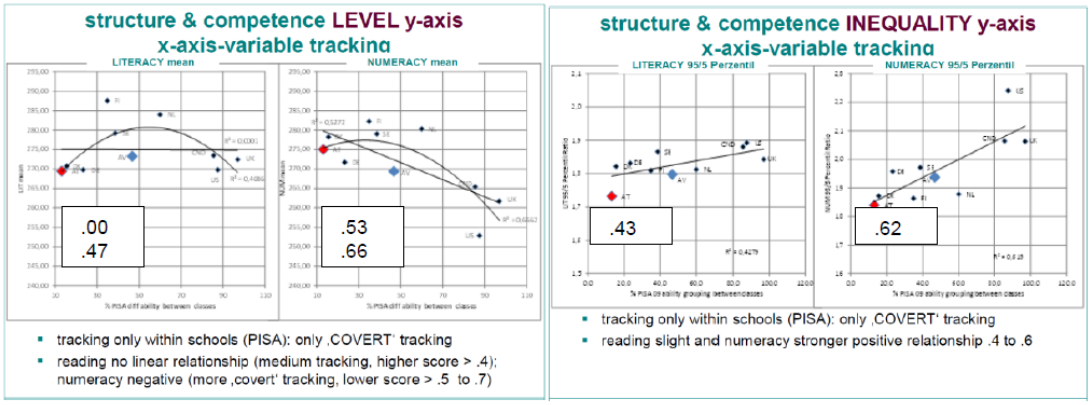
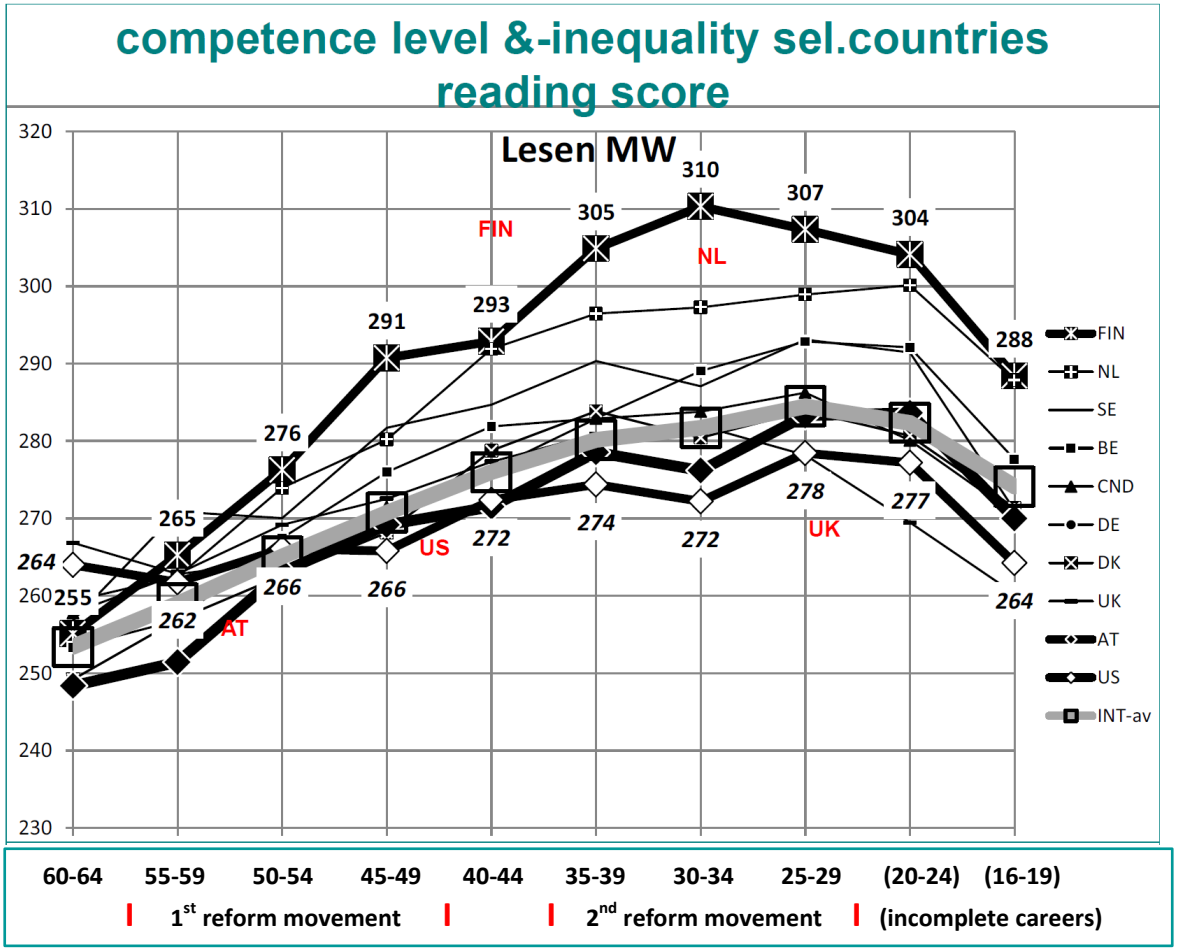


Fig.3 Competence levels in literacy & numeracy (mean score) by age groups in selected countries/regions



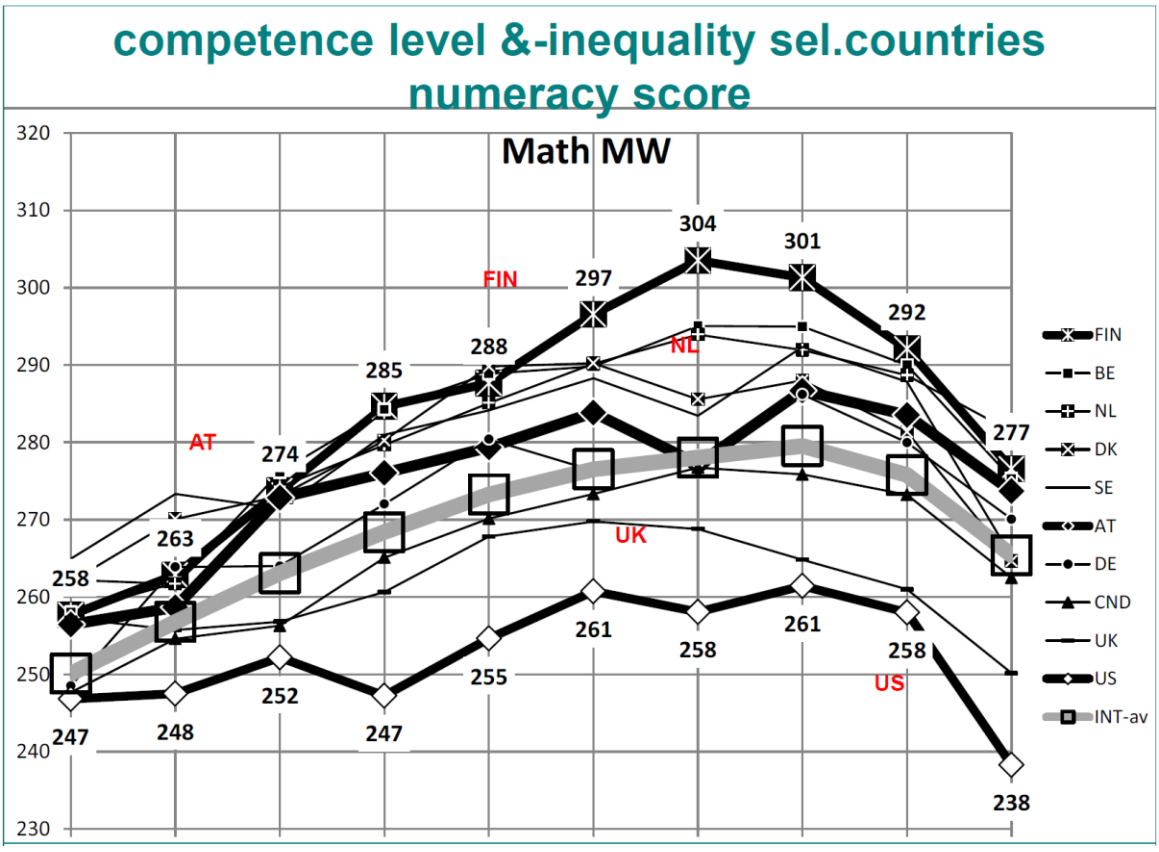
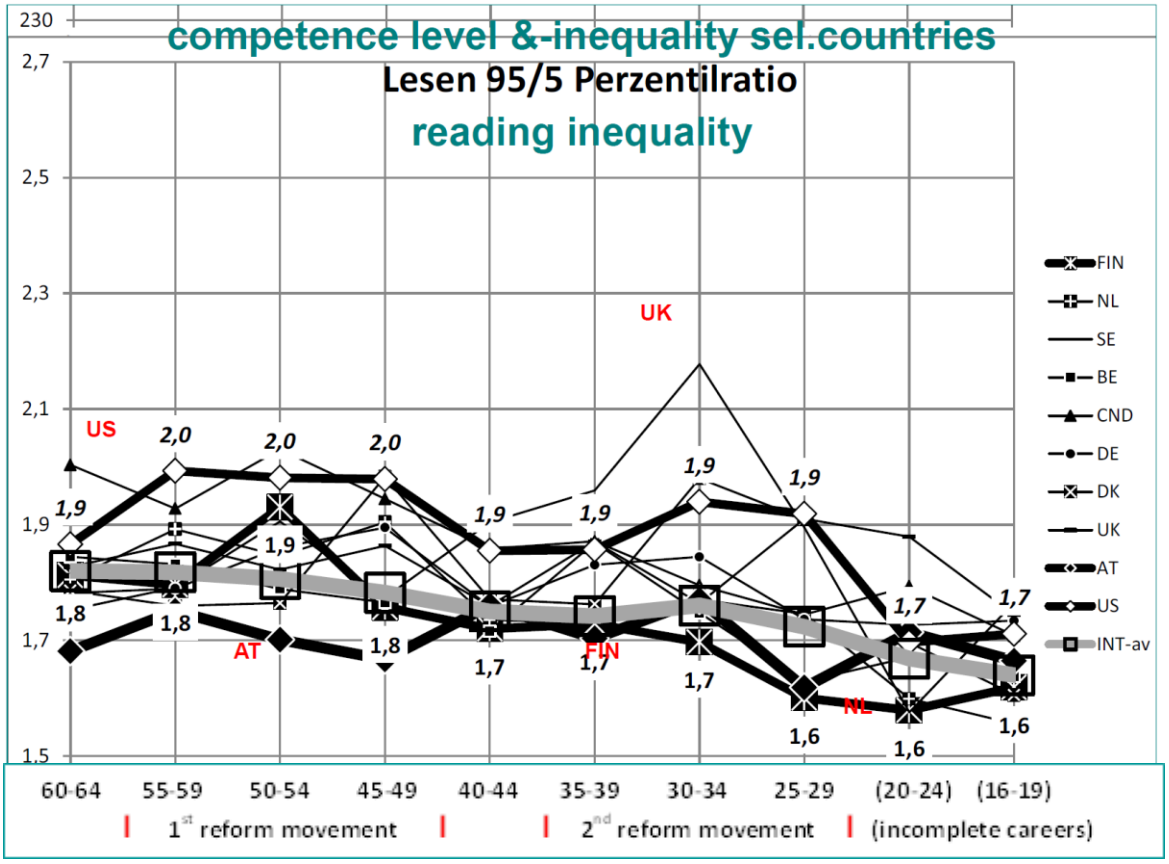


Fig. 4: Competence inequality in literacy & numeracy (mean score) by age groups in selected countries/regions



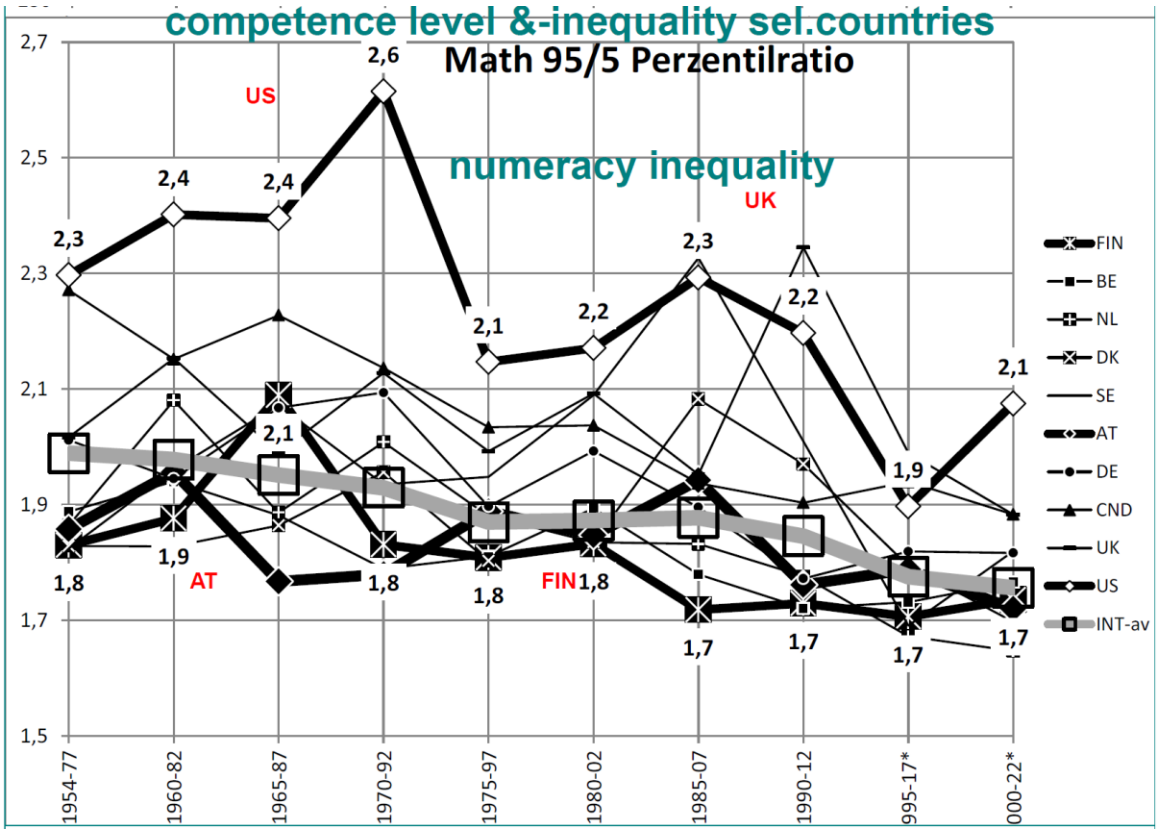
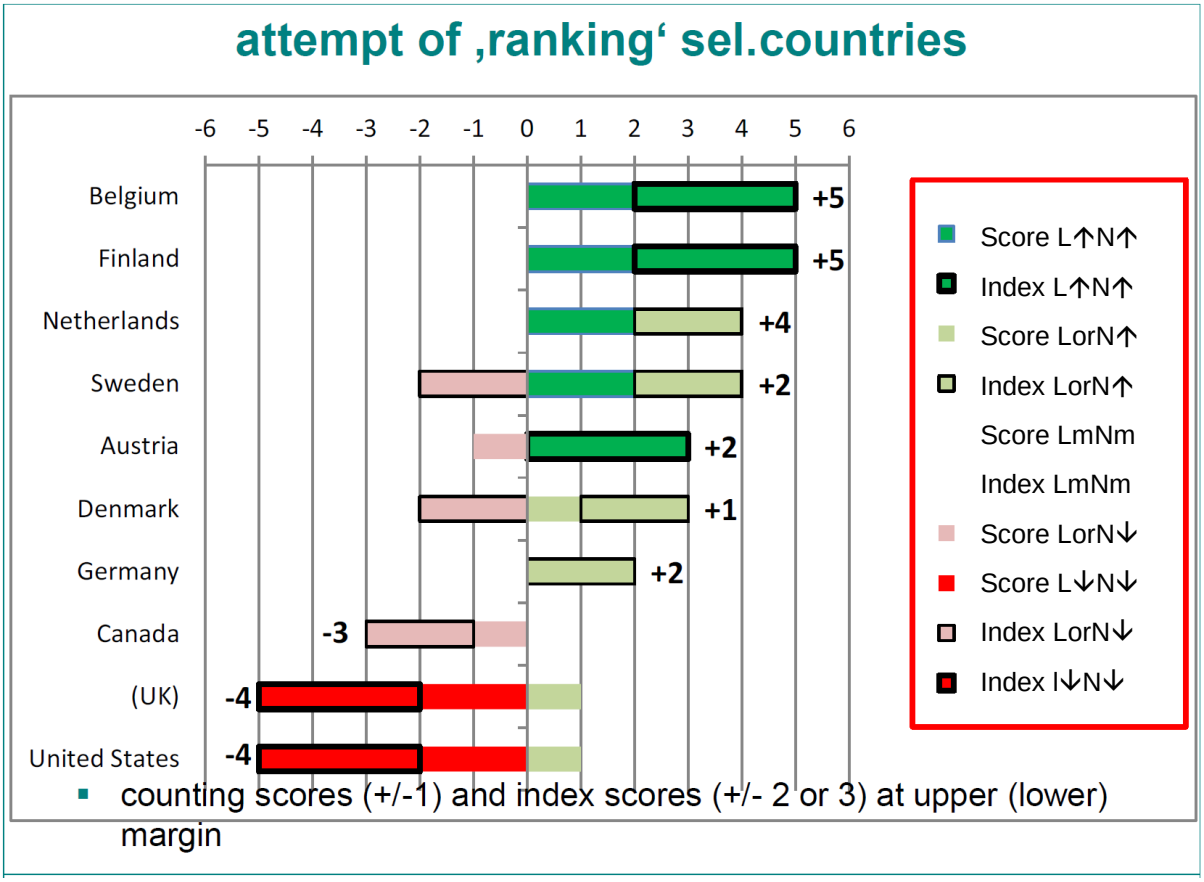


Fig.5: Stylised performace of selected countries/regions



Explanation: For every country the max. (↑), medium (m) and min. (↓) points in the distribution of scores and indices of Literacy (L) and Numeracy (N) were counted for all age groups (medium no values).