

## A Comparative Analysis of the Austrian Model of Formation of Competence

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Contribution to  
“22nd VET and Culture Conference”  
6-8 July 2015, Valencia

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### ...based on a study published in German in a broader Austrian research project...

- Lassnigg, Lorenz; Vogtenhuber, Stefan (2014), 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](http://www.equi.at/dateien/lassnigg-vogtenhuber_2014_ko.pdf)
  - presentation at conference:  
<http://www.equi.at/dateien/lassnigg-piaac-wien-pres.pdf>
  - detailed research report: <http://www.equi.at/dateien/IHS-PIAAC.pdf>
- **PIAAC**: OECD-project (PISA for adults), tested ~5.000 adults  
Programme of International Assessment of Adult Competences

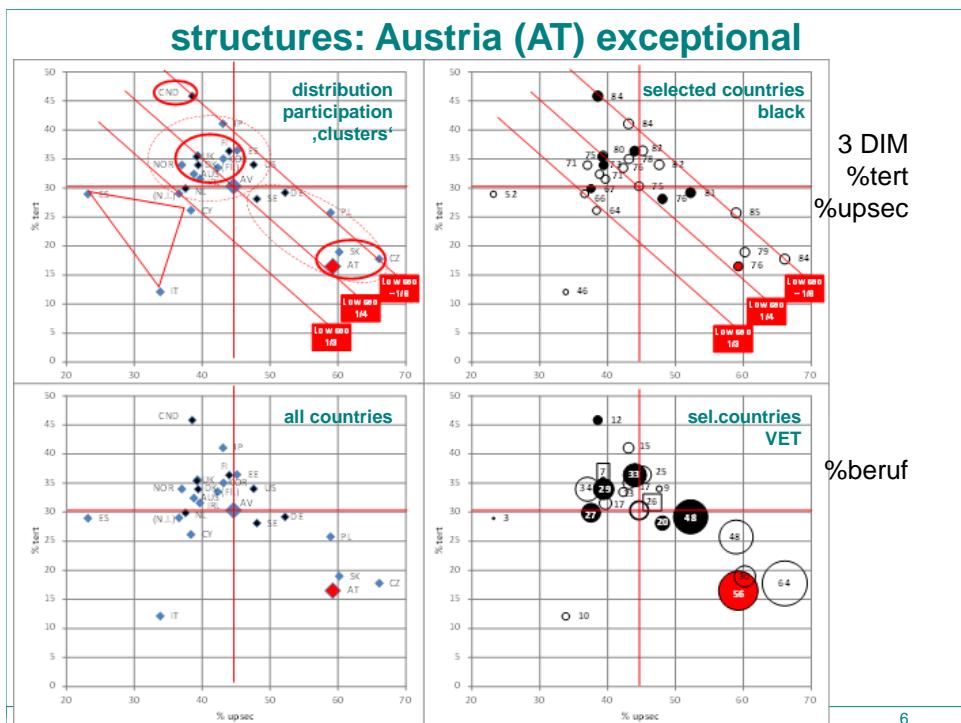
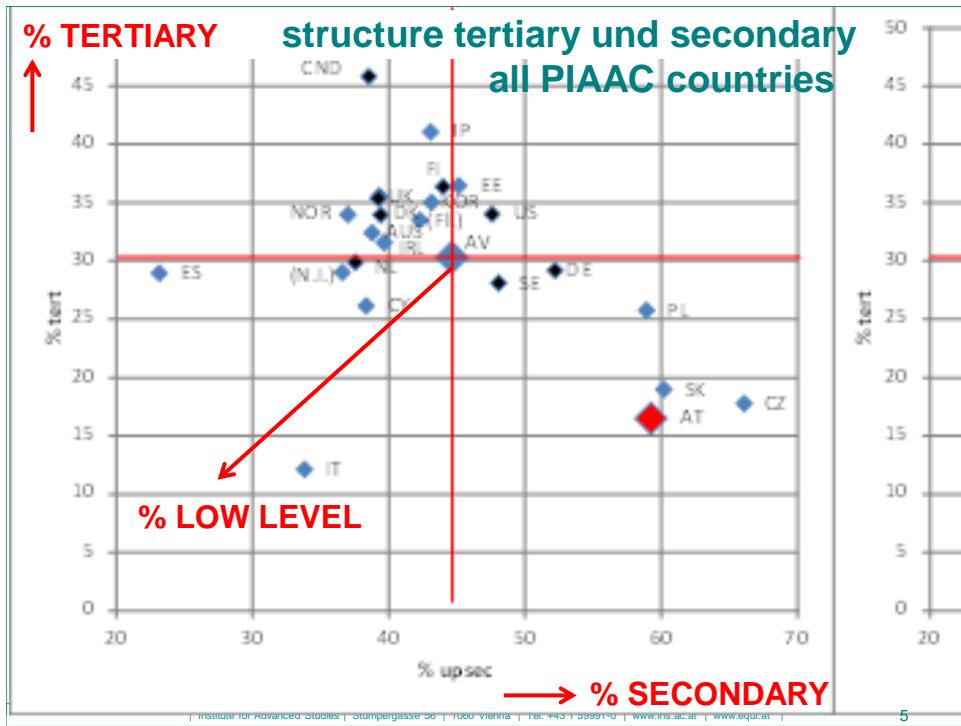
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## agenda

- unique Austrian structure illustrated
- research questions
- basic approach and methodology
- results

## **exceptional/unique structure of Austrian (AT) education**

- ...earliest tracking at age 10 socially selective academic school and mass school...
  - ...missed wave of comprehensive reforms
- ...very high participation in VET at upper secondary level...
- ...comprising full-time school and apprenticeship sectors (dualist)...
- ...which is also tracked by high, medium and lower levels...
- ...low scale and university dominated higher education
  - ...missed wave of upgrading higher level VET institutions to higher education
- Conventionally this structure lets expect a high degree of inequalities and social reproduction
  - empirically mixed...



## exceptional/unique structure of Austrian (AT) education

- slide 6, panel left above:  
AT ,outlier concerning participation
  - with Slovak and Czech Republic
  - high upper secondary, low tertiary, medium prop.low-level education
- slide 6, panel right below:  
AT high proportion of VET within upper secondary education
  - with Czech Republic, Poland and Germany

## research questions

## research questions inspired by Austrian structure...

- ...to put it in a broader picture
- **Exceptional structure...**  
How are **structural traits of education systems** (differentiation of VET/general education; achievement tracking) related to results to **PIAAC competence scores** (level and distribution)?
  - How do **structures of VET** (early VET or late; proportion of VET in initial education) influence the competence level and distribution?
- **Experience of non-reform...**  
Can we trace **signs of past reforms** in different countries in the competences of the adult population through **age specific patterns** of achievement?

## basic approach and methodology

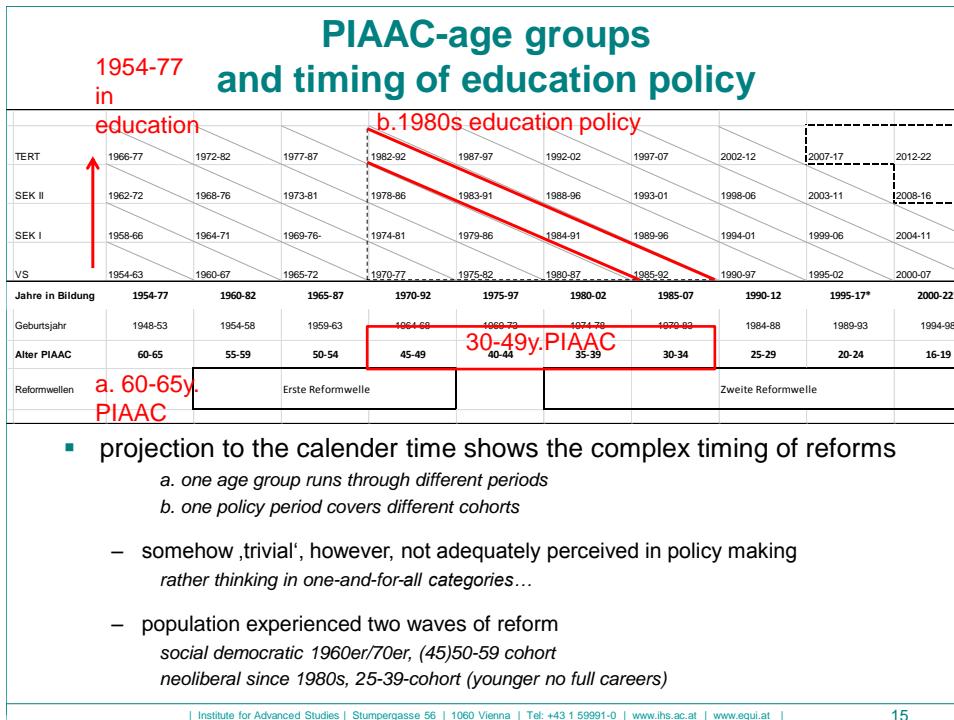
## basic approach 1

- PIAAC observes competences of 16-65-y **population**...
- ...as a result of overall process of **competence/skills production**...
- ...and can be traced back to **the timing of school careers**...
- ...which is also related to concurrent **political / policy** measures...
  - ...having occurred in parallel to the education careers, and have cumulated to **more or less coherent frameworks/mixtures of institutions and practices**
- ...so certain **age groups** have been exposed at certain **stages of careers** to certain **political periods** (reforms)...
- ...the **question** is, whether we can see signs of these policies in the **age-specific competenc(i)es** measured by PIAAC...
  - ...or at least, how the political process is related to the age specific competenc(i)es

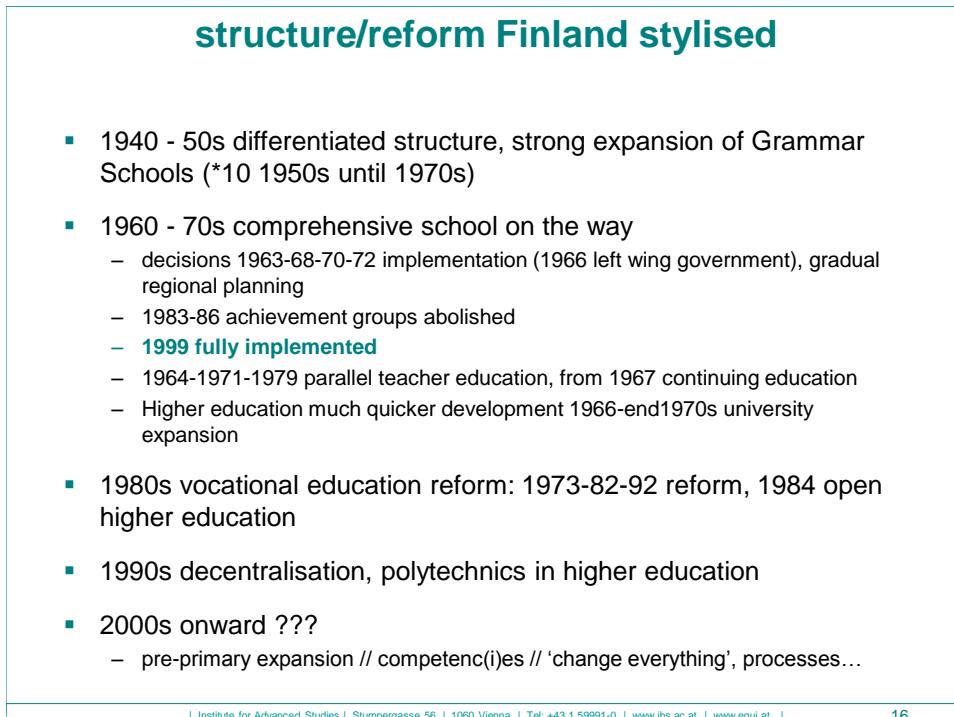
## basic approach 2

- ...we can also ask, whether certain **current educational structures** are related to the **current competenc(i)es** (cross-section)...
- ...having in mind that these structures **have evolved** in a certain (path-dependent) way through the competence formation processes of the observed population...
- ...in this cross-sectional perspective the politics/policies exert their **cumulative influence**...
  - ...here constellations **without much reform** can be compared with constellations that have mainly performed the **1st reform wave** of the 1960s or the **2nd wave** from the 1980s, or **both**
- **problem in the data:** **adult learning** has **not been observed** in a sufficient way (only participation in year before measurement)...
  - ...however, so far the effects of AL have **not been proven to be substantial** in their own right (rather the initial stage has much stronger effects)





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## illustration of flows through education

1st wave reform 1960s social-democratic			2nd wave reform 1980s neoliberal			HE 16 to 19 not 20 to 24 complete																																																																					
						PRIM	LOW SEC	UP SEC																																																																			
			25-39 y	PRIM	LOW SEC	LOW SEC	UP SEC	HE																																																																			
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Birth +6	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22						
Birth	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
60-64	55-59	50-54	45-49	40-44	35-39	30-34	25-29	20-24	16-19	not complete career																																																																	
1st wave reforms			mixed 1st and 2nd			2nd wave reforms																																																																					

- rows are 5-years age groups in PIAAC from 16-19y up to 60-64y

Timing of reform Finland

- columns are calendar years, related to the timing of the education career of the age groups (primary education ~1954-2004)

- and also to the **political time logic** of the same historical period which runs across the career stages
  - showing the **interrelation** of education **careers** with phases of policy **reforms**
  - which is **fairly complex and not easily understandable** at first sight

*...the reactions to PISA often underestimate this timing factor, as the potential for improvement from one wave to the next is quite limited  
measures only improvement between age 12 to 15y (around grades 6 to 9)*

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## structure/reform Finland stylised

- 1940 - 50s differentiated structure, strong expansion of Grammar Schools (\*10 1950s until 1970s)
- 1960 - 70s comprehensive school on the way
  - decisions 1963-68-70-72  
regional planning
  - 1983-86 achievement goals
  - 1999 fully implemented**
  - 1964-1971-1979 parallel tracks
  - Higher education much quality expansion
- 1980s vocational education  
higher education
- 1990s decentralisation,
- 2000s onward ????
  - pre-primary expansion // competenc(i)es // 'change everything', processes...



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## methodology

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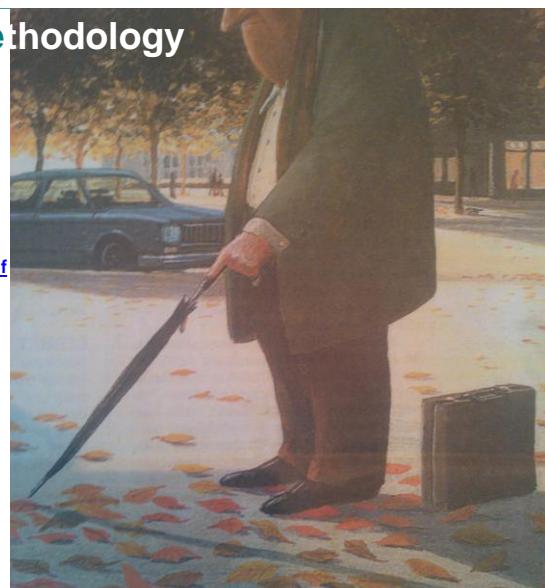
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## methodology

**counting...**

detailed research  
report:

<http://www.equi.at/dateien/IHS-PIAAC.pdf>



Mr Klüter counts up to 4000 leaves per hour, provided it remains windless...

*Herr Klüter zählt bis zu 4000 Blätter in der Stunde,  
vorausgesetzt, es bleibt windstill.*

## methodology

- The methodology includes the following steps:
  - (1) relating age structure of the population to flow through education
  - (2) analysis of structural traits: 'tracking' in selected systems
    - Finland, Sweden, Denmark // U.K., Canada, US // Netherlands, Germany, Austria
  - (3) cross-sectional analysis: structural patterns & obs.competences
    - mean and/or median; 95/5 and 75/25-percentil-ratios;
  - (4) analysis of the timeline of reforms
  - (5) exploring age specific patterns of competenc(i)es & reforms
    - level and distribution
- so far mainly at the level of descriptive cross-tabulations or trend-analyses
  - will be further developed through modeling and confirmatory approaches

## results

## results

### **Already shown:**

- uncovering of patterns, of how education reforms translate into the competency/e/ or skills formation process of the population
  - time dependent and complicated pattern of 'translation process'
- exceptional/unique structure of Austrian education

### **Cross-sectional (cumulative) structures: ,tracking' & competenc(i)es**

- PISA indicators about differentiation at level of individual schools are misleading, because they do not catch the differentiation between schools
  - a classification that takes into account both forms shows, that - against expectations - the differentiated vocational systems are not correlated with a greater degree of inequalities of the competences in the population

### **Exploration of reform history and competenc(i)es**

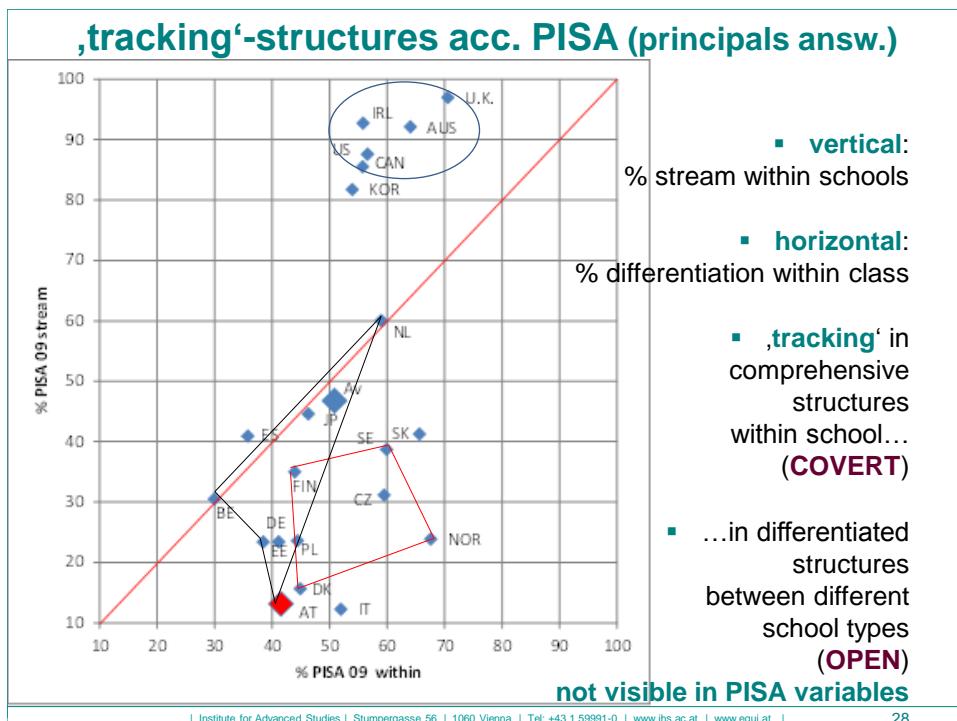
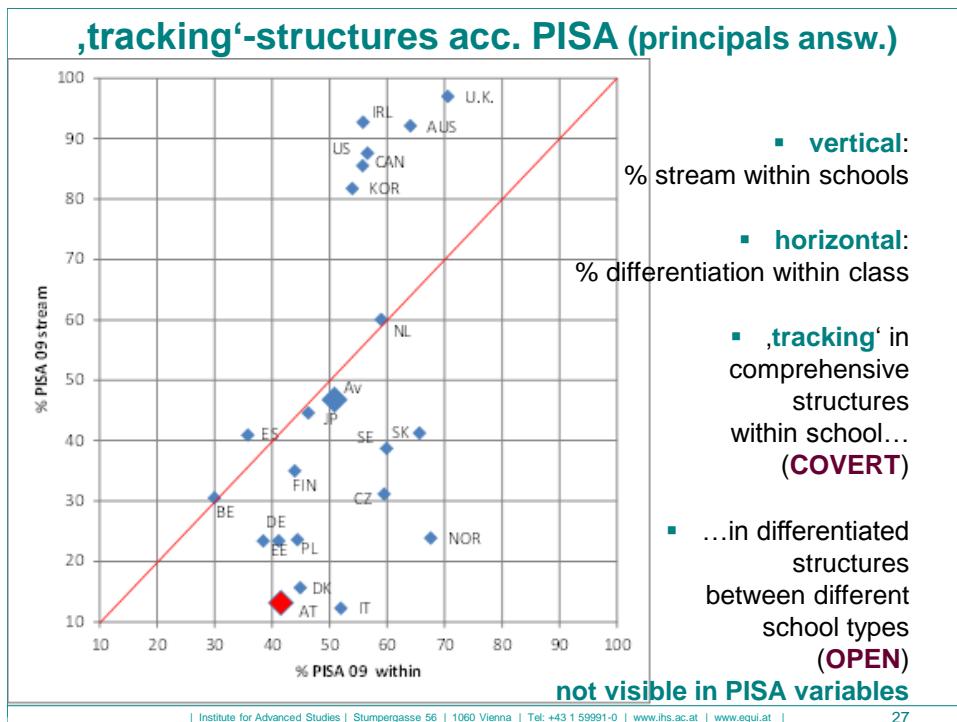
- analysis of reform policies: Finland & US extreme cases
  - Finland a very consequent long term reform process that is correlated to the competence profiles;
  - the US no positive results related to their reform policies since the 1980s.

## **cross-sectional (cumulative) structures: ,tracking' and PIAAC competences**

## cross-sectional (cumulative) structures: 'tracking' and PIAAC competences

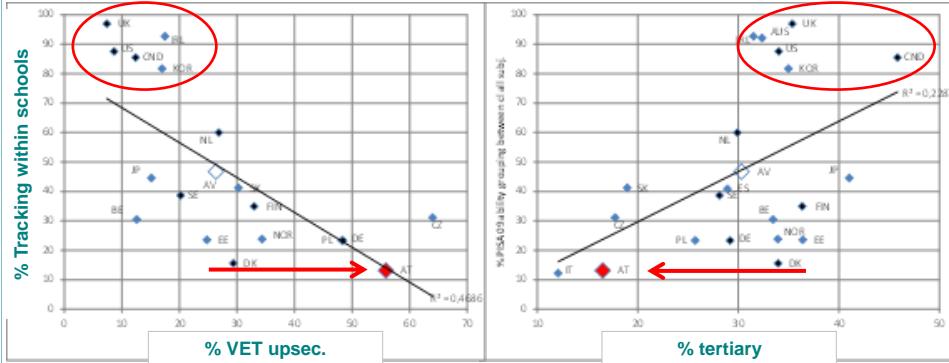
- a. classification of tracking structures based on information from PISA (2009, 12) about differentiation within schools ('**covert tracking**'):
  - amount of streaming (diff within schools)
  - amount of setting (diff. within class)
- b. tracking of different school types, not covered by PISA-variables ('**open tracking**')
  - > these countries display low level of tracking at PISA variables
- question: how is tracking related to competency/e levels and distribution?

### a. classification



## ....covert' tracking related to tertiarisation and vocationalism...

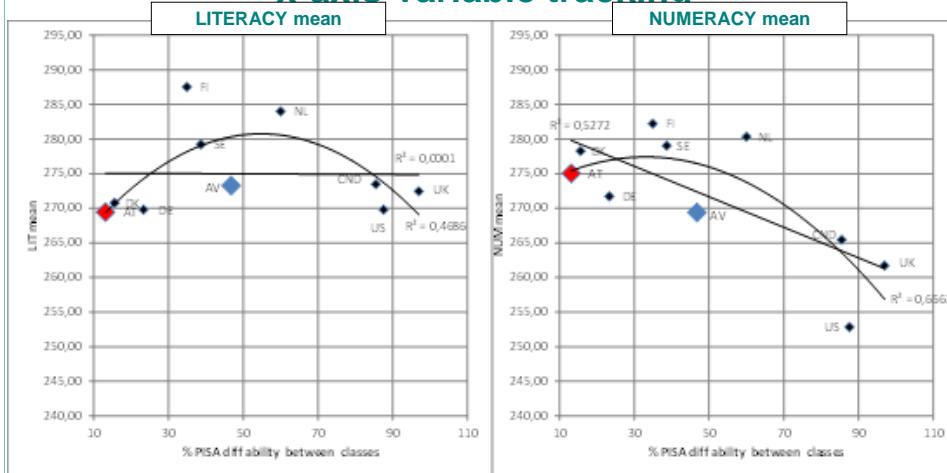
- ...in countries with high level of ,covert' tracking
  - VET participation is low
  - tertiary participation is high
- ...Austria reverse



## b. tracking and competency/e levels and distribution

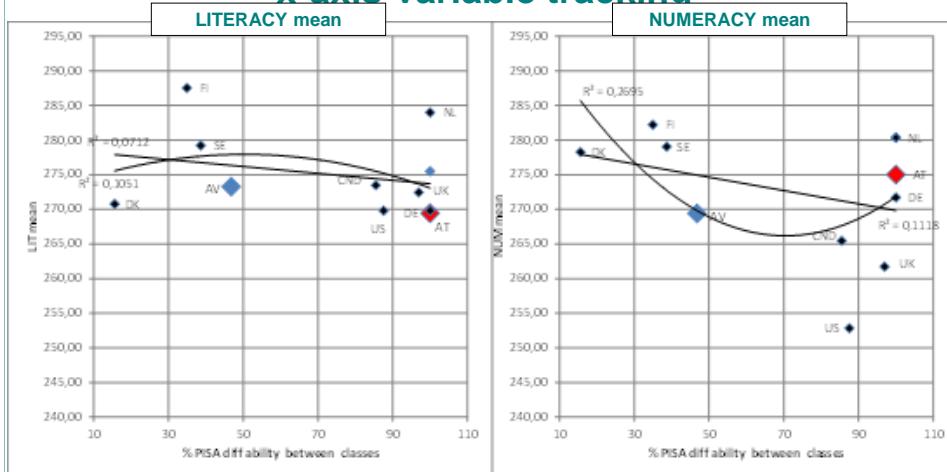
- ...both classifications of tracking (,covert' and ,open') compared...
- ...to competency/e indicators
  - level: test scores
  - distribution: 95/5 percentile
- ...complex relationships between educational structure and competenc(i)es...

## structure & competency/e LEVEL y-axis x-axis-variable tracking



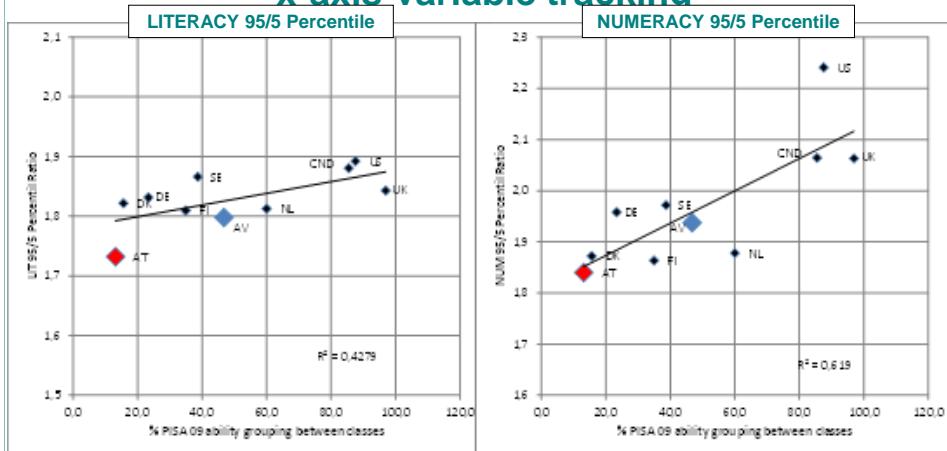
- tracking only within schools (PISA): only ,**COVERT**‘ tracking
- reading no linear relationship (medium tracking, higher score > .4); numeracy negative (more ,covert‘ tracking, lower score > .5 to .7)

## structure & competency/e LEVEL y-axis x-axis-variable tracking



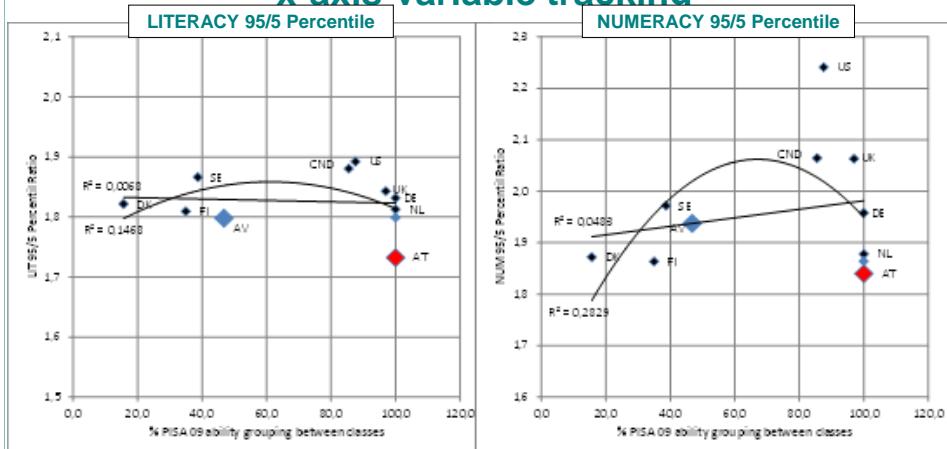
- combined tracking PISA and institutional (**BOTH**,**covert+**,**open**)
- reading: less relationship, not more 0 to .1
- numeracy: also less relationship .1 to .3 > both against expectation

## structure & competency/e INEQUALITY y-axis x-axis-variable tracking



- tracking only within schools (PISA): only ,**COVERT**‘ tracking
- reading slight and numeracy stronger positive relationship .4 to .6

## structure & competency/e INEQUALITY y-axis x-axis-variable tracking



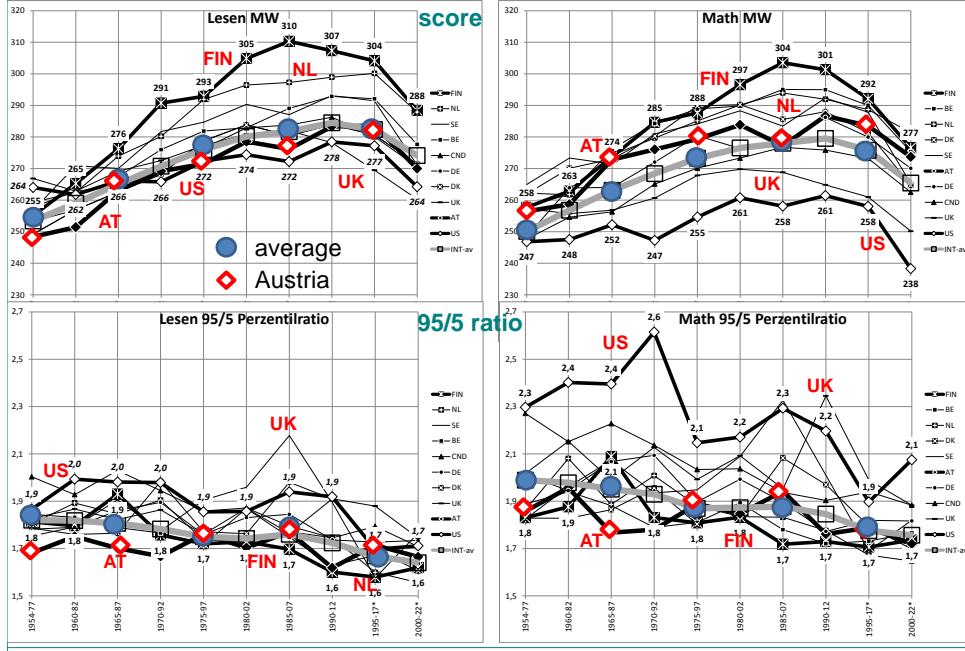
- combined tracking PISA and institutional (**BOTH ,covert+open**)
- reading (0 to .1) and numeracy (0 to .2) weakening of relationship
- OVERALL: no support for widely held expectation that openly tracked systems increase inequality of competenc(i)es (and scores)

## reform history and competenc(i)es

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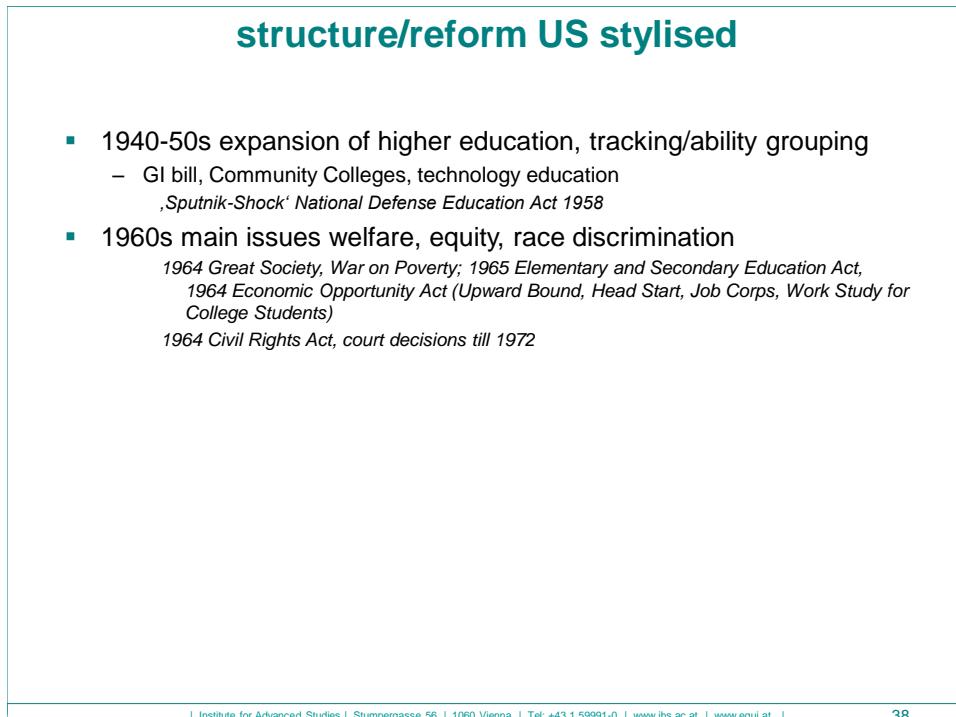
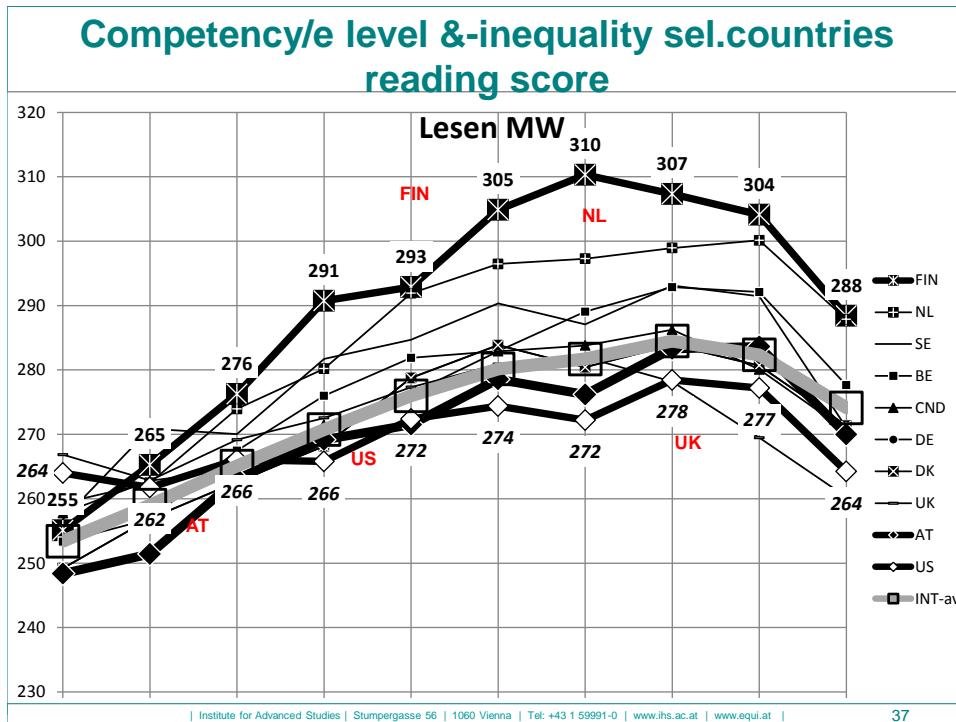
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### Competency/e level &-inequality sel.countries



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## structure/reform US stylised



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## structure/reform US stylised

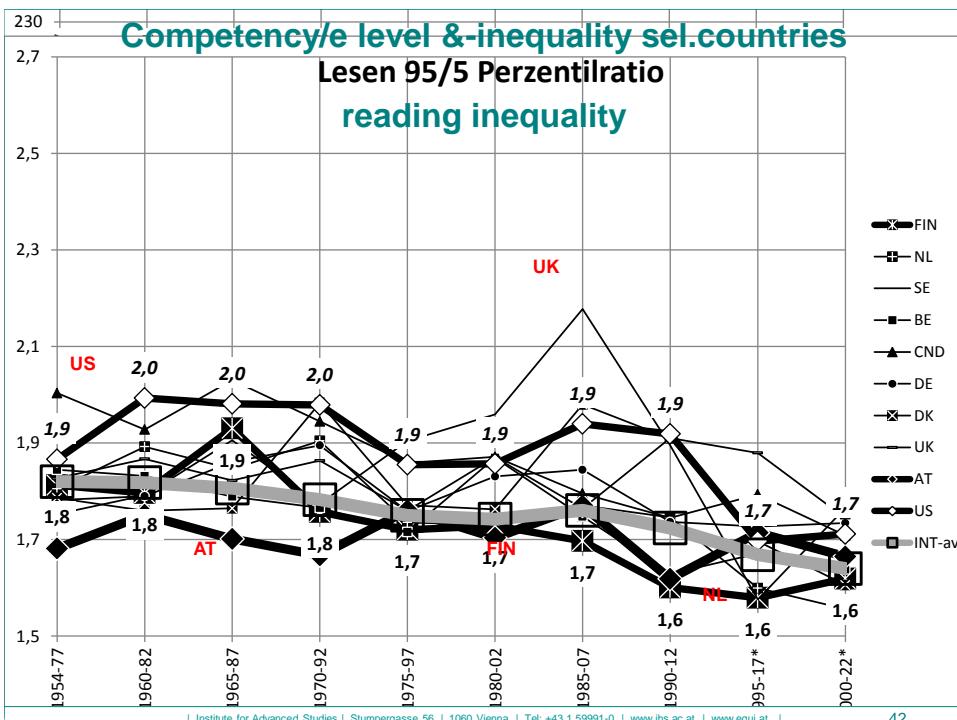
- 1940-50s expansion of higher education, tracking/ability grouping
  - GI bill, Community Colleges, technology education  
*Sputnik-Shock' National Defense Education Act 1958*
- 1960s main issues welfare, equity, race discrimination
  - 1964 Great Society, War on Poverty; 1965 Elementary and Secondary Education Act, 1964 Economic Opportunity Act (Upward Bound, Head Start, Job Corps, Work Study for College Students)*
  - 1964 Civil Rights Act, court decisions till 1972*
- 1970s War on Poverty sacrificed to War on Vietnam, crisis in

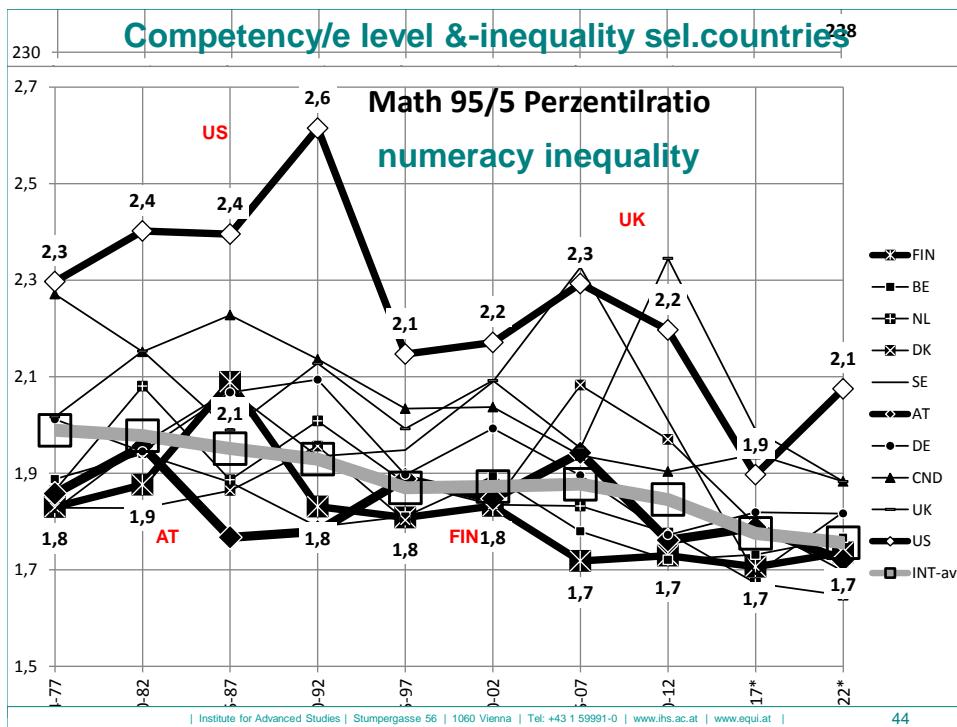
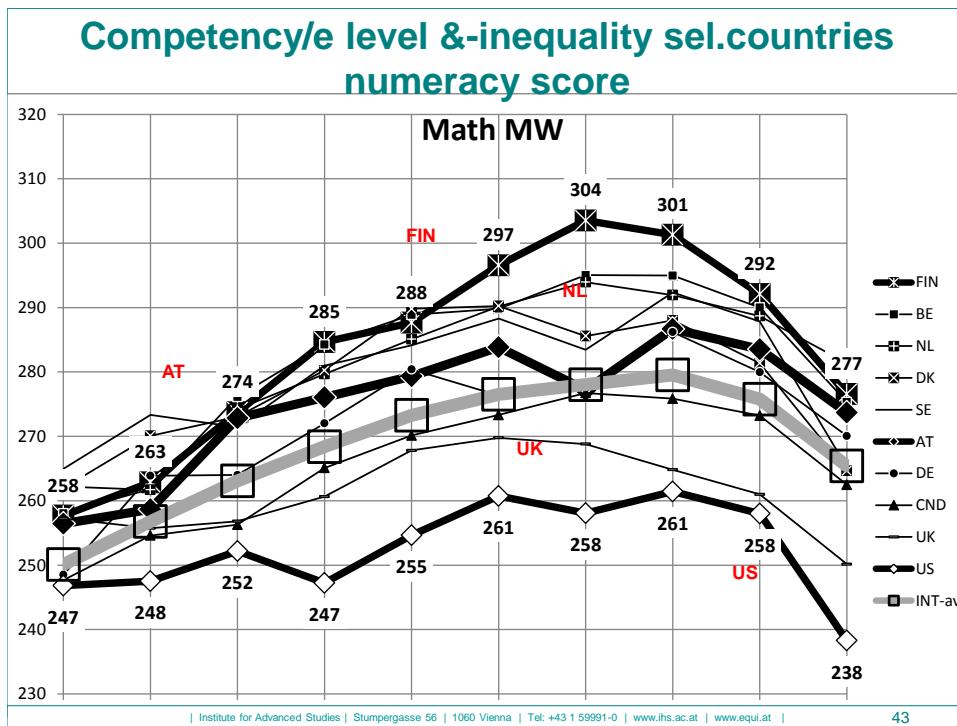


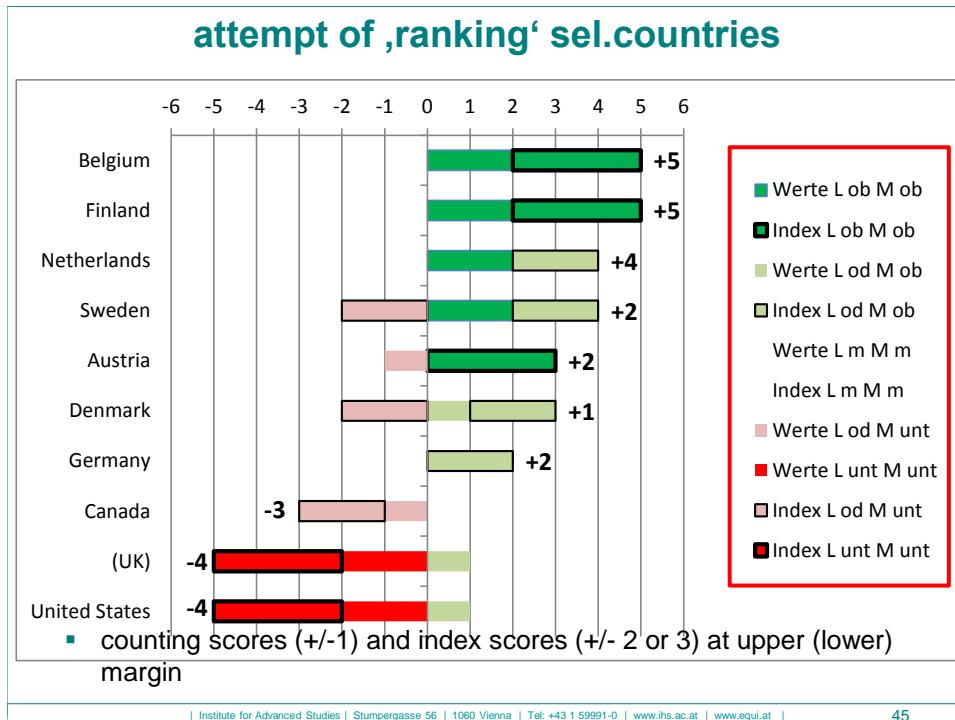
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## structure/reform US stylised

- 1940-50s expansion of higher education, tracking/ability grouping
  - GI bill, Community Colleges, technology education  
,Sputnik-Shock' National Defense Education Act 1958
- 1960s main issues welfare, equity, race discrimination
  - 1964 Great Society, War on Poverty; 1965 Elementary and Secondary Education Act,
  - 1964 Economic Opportunity Act (Upward Bound, Head Start, Job Corps, Work Study for College Students)
  - 1964 Civil Rights Act, court decisions till 1972
- 1970s War on Poverty sacrificed to War on Vietnam, crisis in Community Colleges, and heavy disputes about High School
  - academic vs. diversified vocational, civic, etc. (start of ,Rigorous Academic Curriculum' and ,Minimum Graduation Standards'), beginning critique to tracking
- 1980-90s period of ,De-Tracking'-policy, beginning of ,Standards Movement'
  - 1983 Nation at Risk, 1994 Goals 2000 (legal requirement, not met)
- late 1990s and 2000s: increasing 'High Stakes' standards policy
  - 2001 No Child Left Behind, money for measured achievement, sanctions if failed, currently (Obama Administration) ,Common Core Standards'







### verbal interpretation (German)

KOMPETENZWERTE		
Hohe Werte und positive Entwicklung ( <b>Finnland, Belgien, Niederlande</b> )	Gemischt mittlere Werte und Entwicklung ( <b>Schweden, Österreich, Deutschland, Dänemark</b> )	Niedrige Werte und ungünstige Entwicklung ( <b>Vereinigtes Königreich (England, Nordirland)</b> , USA, Kanada)
<p>▪ Scores</p> <ul style="list-style-type: none"> <li>- In <b>E</b> auf <b>b</b> Ungle</li> <li>- in <b>F</b> die <b>e</b> reduz</li> <li>- <b>UK, US, CAN unsatisfactory</b></li> </ul>		<p>eiden ngert,</p> <p>gleich eiden bit mit</p>

KOMPETENZWERTE		
KOMPETENZVERTEILUNG		
Hohe Werte und positive Entwicklung ( <b>Finnland, Belgien, Niederlande</b> )	Gemischt mittlere Werte und Entwicklung ( <b>Schweden, Österreich, Deutschland, Dänemark</b> )	Niedrige Werte und ungünstige Entwicklung ( <b>Vereinigtes Königreich (England, Nordirland)</b> , USA, Kanada)
<p>▪ In <b>Belgien</b> und den <b>Niederlanden</b> ist auf beiden Indikatoren eine geringe Ungleichheit weiter reduziert worden.</p> <p>- in <b>Finnland</b> ist bei beiden Indikatoren die eher geringe Ungleichheit leicht reduziert worden</p> <ul style="list-style-type: none"> <li>▪ BE, NL, FIN small inequ.further reduced</li> <li>▪ DK, SE, AT, DE complex</li> <li>▪ US, CAN high inequ reduced, but still high UK high not reduced</li> </ul> <p>- <b>Dänemark</b> ist bei der Quartilsratio die eher geringe Ungleichheit leicht reduziert worden, bei der 95/5 Percentilratio gibt es sehr starke Schwankungen nach oben und nach unten bei geringer Gesamtveränderung im Trend</p> <p>- <b>Schweden</b> liegt bei der Quartilsratio ohne größere Veränderung im Mittelfeld, zeigt bei 95/5 Percentilratio sehr starke Schwankungen nach oben und nach unten bei geringer Gesamtveränderung im Trend</p> <p>- in <b>Österreich</b> ist die Ungleichheit auf beiden Indikatoren eher gering, hat sich aber nicht reduziert</p> <p>- <b>USA</b> und <b>Kanada</b> haben auf beiden Indikatoren die Ungleichheit verringert, sie bleibt aber hoch</p> <p>- Das <b>Vereinigte Königreich (England, Nordirland)</b> hat bei beiden Indikatoren eine hohe Ungleichheit mit sehr geringer Veränderung</p>		

## summary

- Austria exceptional structure, high tracking, high upper secondary education and high VET
- comprehensive structures include ‚covert‘ tracking, there seems to be a relationship between tertiary education and tertiary education, and of VET with ‚open‘ tracking
- selected countries: Finland exceptionally positiv, Nordic countries different; ‚liberal‘ countries negativ, ‚continental‘ countries also different (NL, BE good; DE, AT mixed, medium)
- marked ‚openly‘ differentiated systems as well as VET provide similar scores and inequality as low differentiated comprehensive systems (unfavourable: ‚covertly‘ differentiated comprehensive systems

## Material, Annex

- detailed report: [www.equi.at/dateien/IHS-PIAAC.pdf](http://www.equi.at/dateien/IHS-PIAAC.pdf)

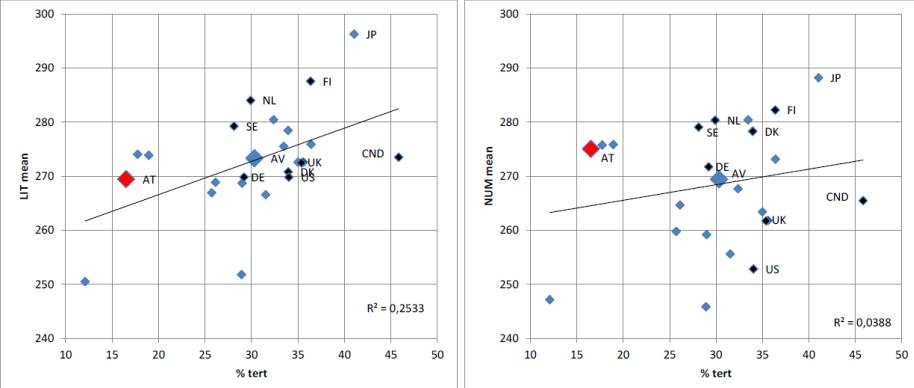


### **Annex:**

- tertiary participation and competenc(i)es (slides 51-54)
- age-specific competenc(i)es by educational credentials in Austria (slides 55ff)

## tertiary participation and scores, all countries

(b) % Tertiärstufe

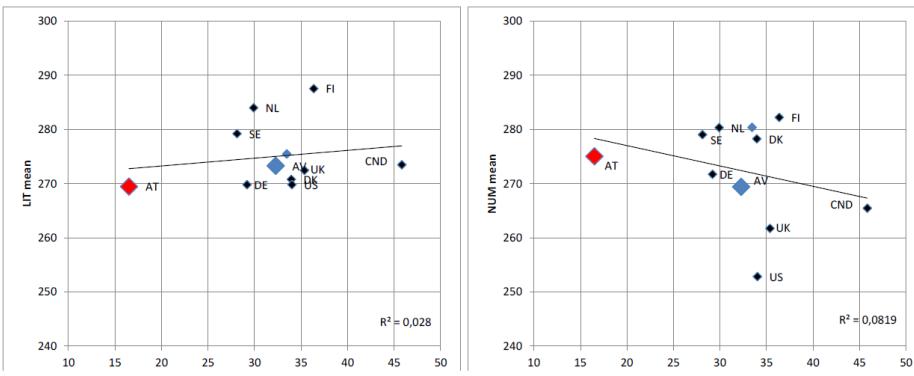


Korrelation wesentlich bestimmt durch Ausreißer (unten Italien, oben Japan, ohne die beiden Länder:  $R^2$  LIT .04)

- Corr. determined by outliers: below IT, above JP, literacy corr. reduced to .04 if these outliers are eliminated

## tertiary participation and scores, sel.countries

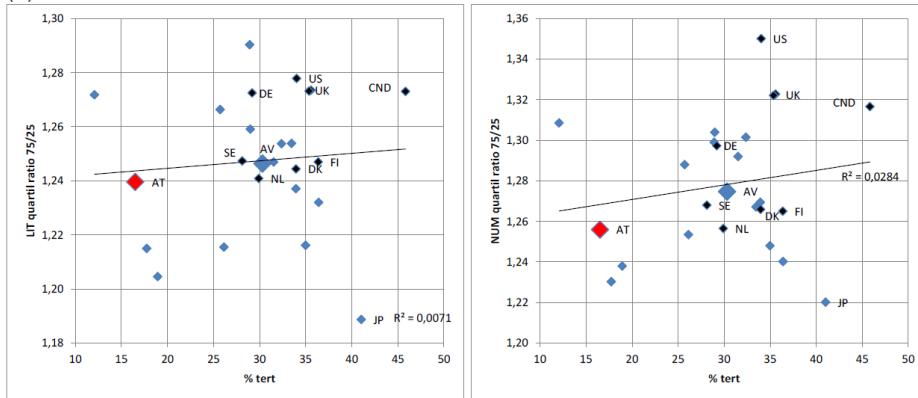
(a) Tertiärstufe



- no corr. in selected countries

## tertiary participation and inequality, all countr.

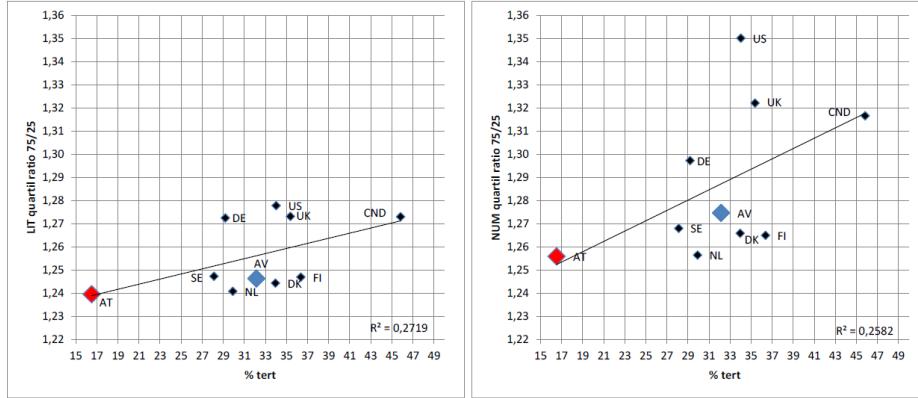
(b) % Tertiärstufe



- 75/25 ratio no corr.

## tertiary participation and inequality, sel.countr.

(b) % Tertiärstufe



- 75/25 ratio positive corr., stronger in numeracy

## competenc(i)es by education credentials in Austria

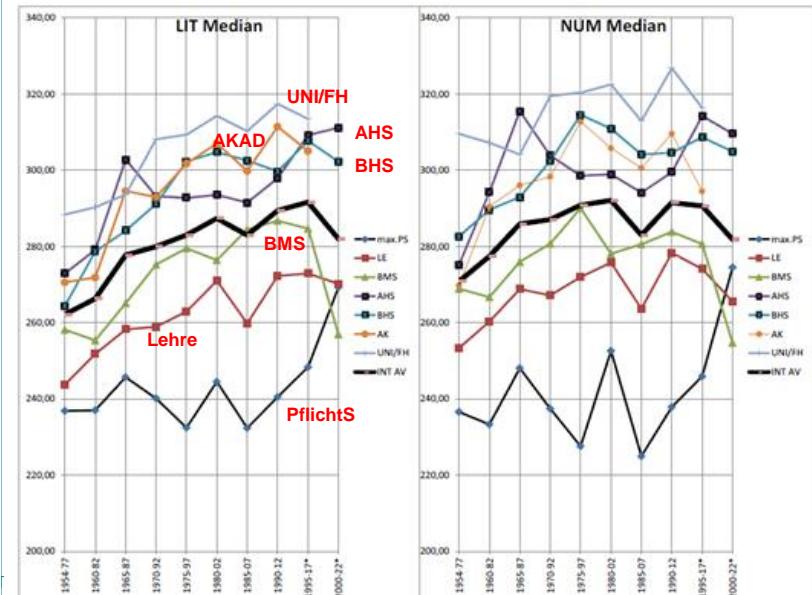
- UNI/FH      TERT (Univ. + Fachhochschule/Polytechnic)
- Akademie    TERT, non-university
- AHS          ACADEMIC upper secondary
- BHS          VET colleges, higher level
- BMS          VET schools, medium level
- Lehre/BS     APPRENTICESHIP
- Pflichtschule COMPULSORY SCHOOL (lower secondary)

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Entwicklung der Kompetenzwerte nach Bildungsabschlüssen, Lesen und Mathematik nach Altersgruppen in bildungspolitischer Zeit

## Austria: scores by education credentials Punktwerte



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