
The Economic Value of Higher Teacher Quality

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Overview

- Good teachers are essential to improved schools

BUT

- Too hard to change so we will stay with current policies

Very different economic futures based on today's actions

- Total focus on current problems
 - Ignoring long run means constant future problems
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Lack of Economic Considerations

- All attention on potential achievement impact
 - No consideration of economic aspects
 - Exceptions – supporting status quo
 - Is performance pay sustainable?
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Private Markets and Salaries

- Private salaries taken as measure of productivity
 - If pay too little, workers leave
 - If pay too much, go broke
 - Mobility natural for job matching
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Teacher Markets and Salaries

- Teacher salaries politically set through bargaining
 - Not responsive to demands
 - Buffered from market by:
 - Excess production of teachers
 - Lack of quality differentiation
 - No information on value
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Backdrop of Teacher Pay Discussions

- Teachers most important input
 - No identifiable characteristics
 - Master's degrees
 - Experience*
 - Certification
 - Preparation
 - Professional development
 - Cannot regulate and pay on characteristics
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What would we like to know?

- Shortages

- Math/science
- Special education
- Foreign languages
- **Quality**

- What is demand for teachers (by quality)?
 - What is supply of teachers (by quality)?
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Some Key Parameters

- Impact of teacher on achievement

$$A_{it} = (1 - \theta)A_{it-1} + \delta_j + \beta X_i + v_{it}$$

- Impact of higher achievement on earnings

$$\ln Y_i = \alpha_0 + rS_i + \alpha_1 \text{Exper}_i + \alpha_2 \text{Exper}_i^2 + \phi CS_i + \varepsilon_i$$

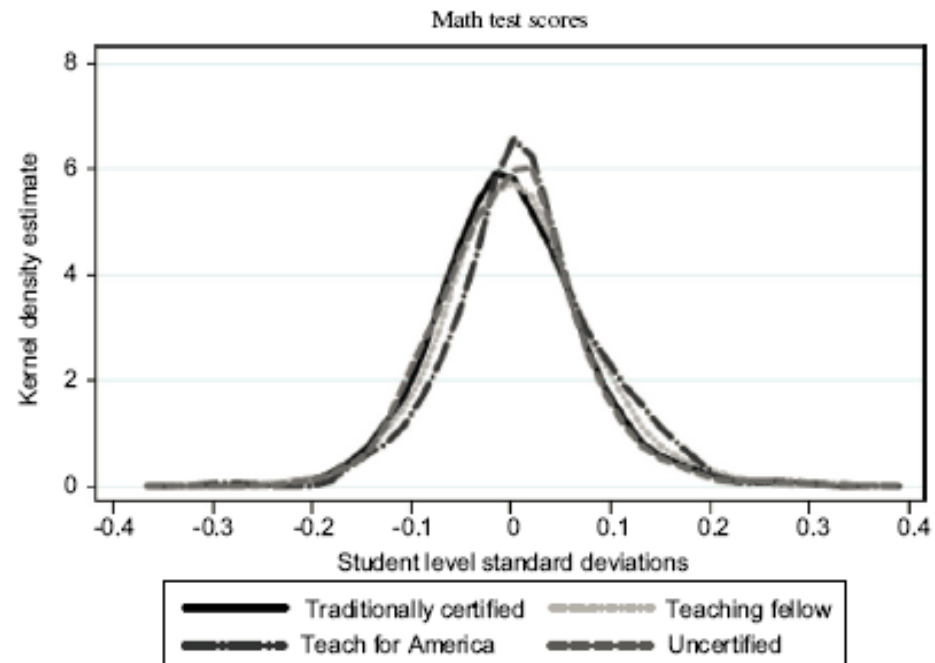
- Scope of teacher influence
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Demand for Quality: Teacher Impact through Individual Earnings

Distribution of Effectiveness σ_W

628

T.J. Kane et al / Economics of Education Review 27 (2008) 615–631



Teacher Effectiveness (σ_W)

		reading	math
Rockoff (2004)	New Jersey	0.10	0.11
Nye, Konstantopoulos, and Hedges (2004)	Tennessee	0.26	0.36
Rivkin, Hanushek, and Kain (2005)	Texas	0.10	0.11
Aaronson, Barrow, and Sander (2007)	Chicago		0.13
Kane, Rockoff, and Staiger (2008)	New York City	0.08	0.11
Jacob and Lefgren (2008)	Undisclosed city	0.12	0.26
Kane and Staiger (2008)	Los Angeles	0.18	0.22
Koedel and Betts (2009)	San Diego		0.23
Rothstein (2010)	North Carolina	0.11	0.15
Hanushek and Rivkin (2010)	Undisclosed city		0.11
AVERAGE		0.13	0.17

Mincer earnings estimates (ϕ)

Study	Effect of cognitive skills
Mulligan (1999)	0.11
Murnane, Willett, Duhaldeborde, and Tyler (2000)	0.10-0.15
Lazear (2003)	0.12
Hanushek and Zhang (2009)	0.20
Hanushek and Woessmann (2009)	0.14
Chetty et al. (2010)	0.18

Baseline Calculations

- Earnings return

$$\phi = 0.13$$

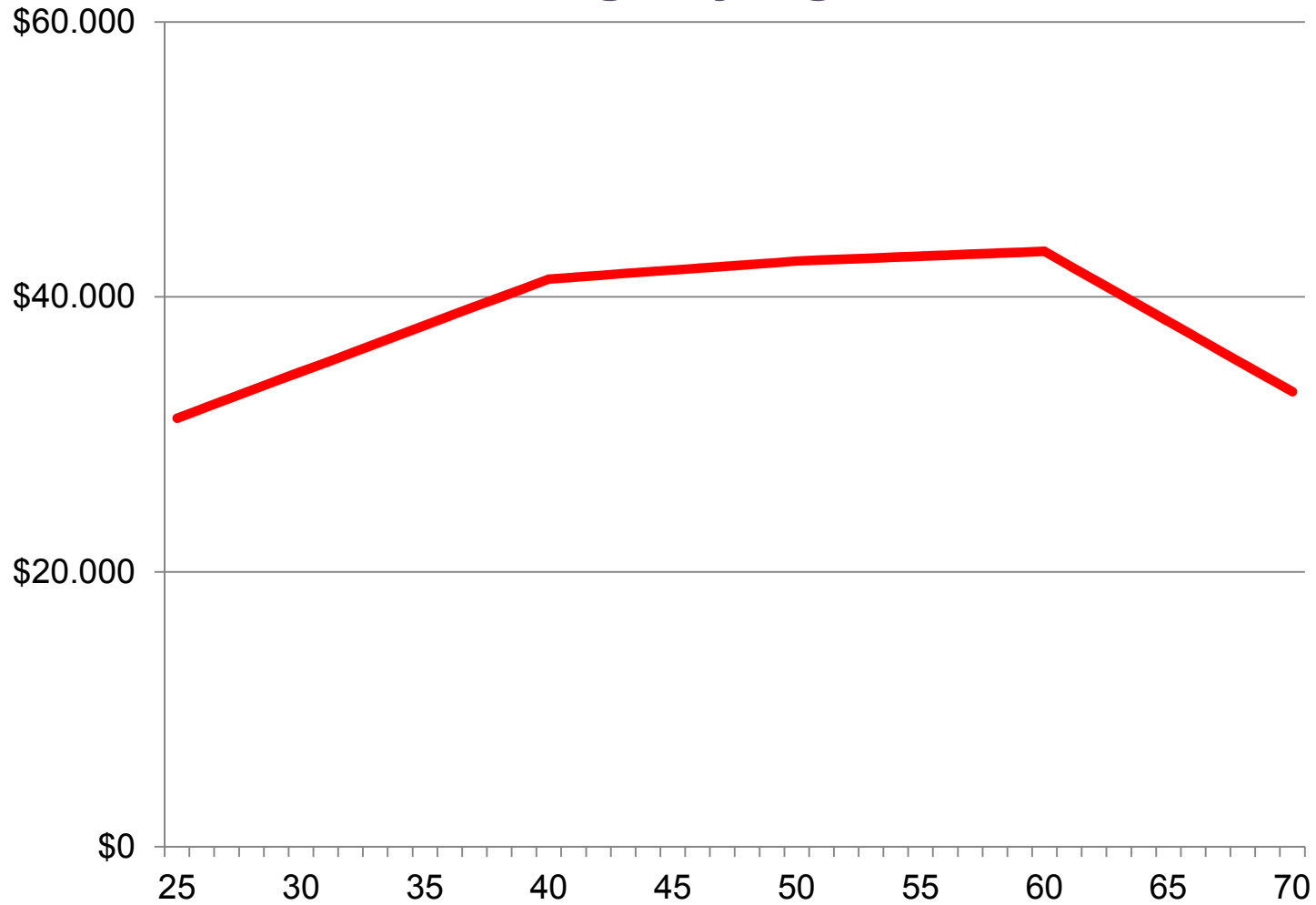
- Standard deviation of Teacher Quality

$$\sigma_T = 0.2$$

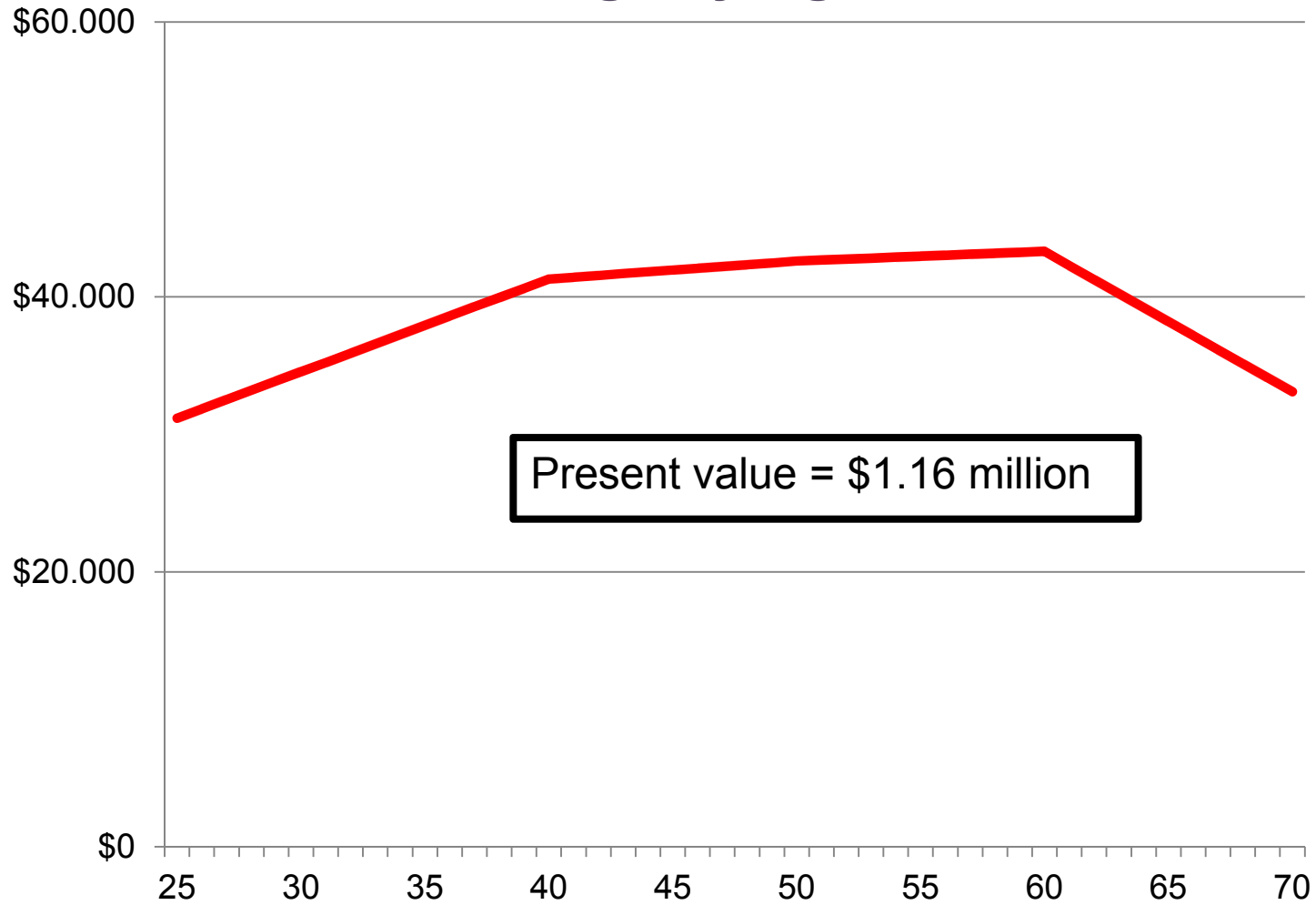
- Achievement depreciation

$$\theta = 0.3$$

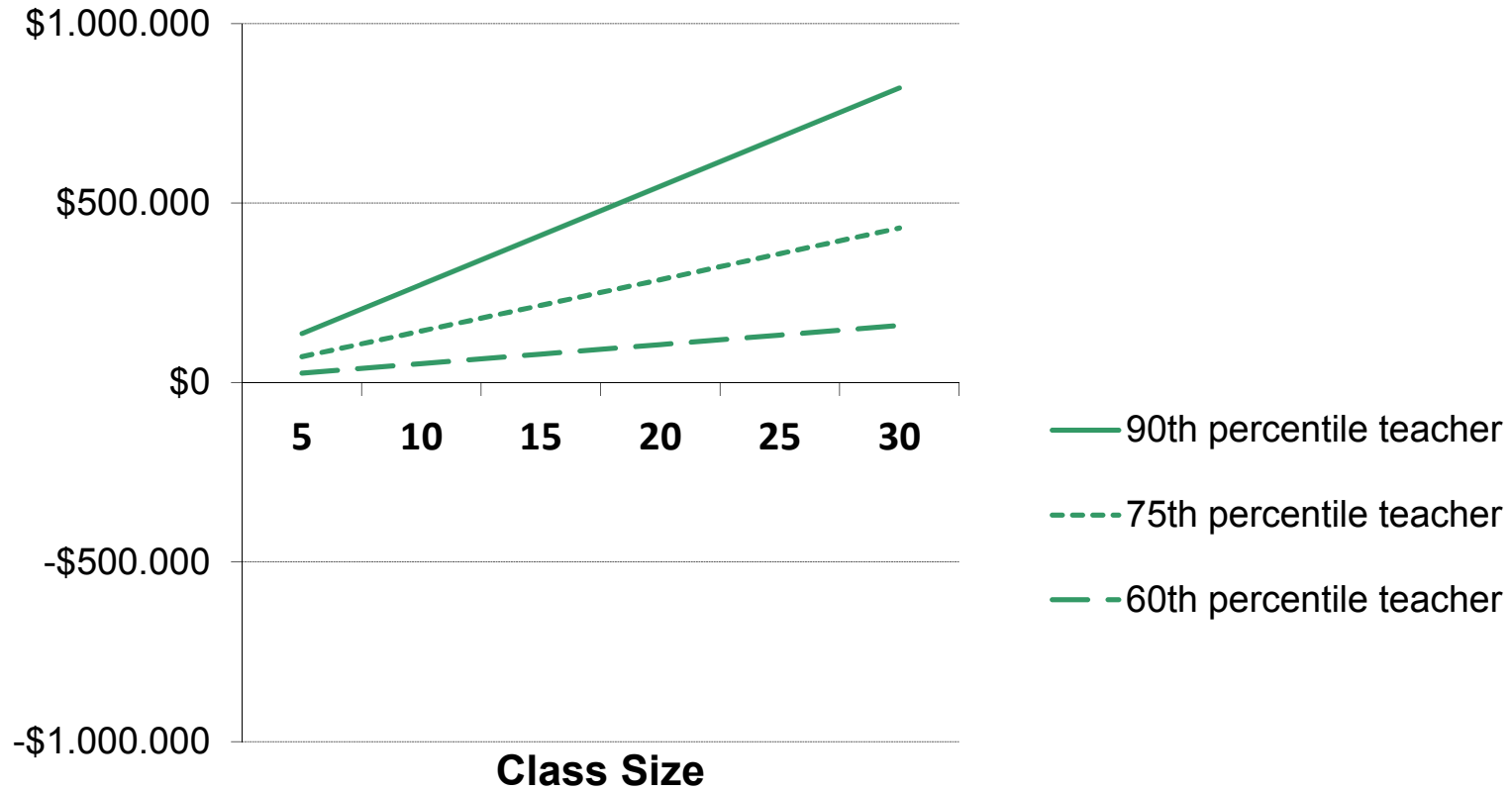
Median Earnings by Age – 2010



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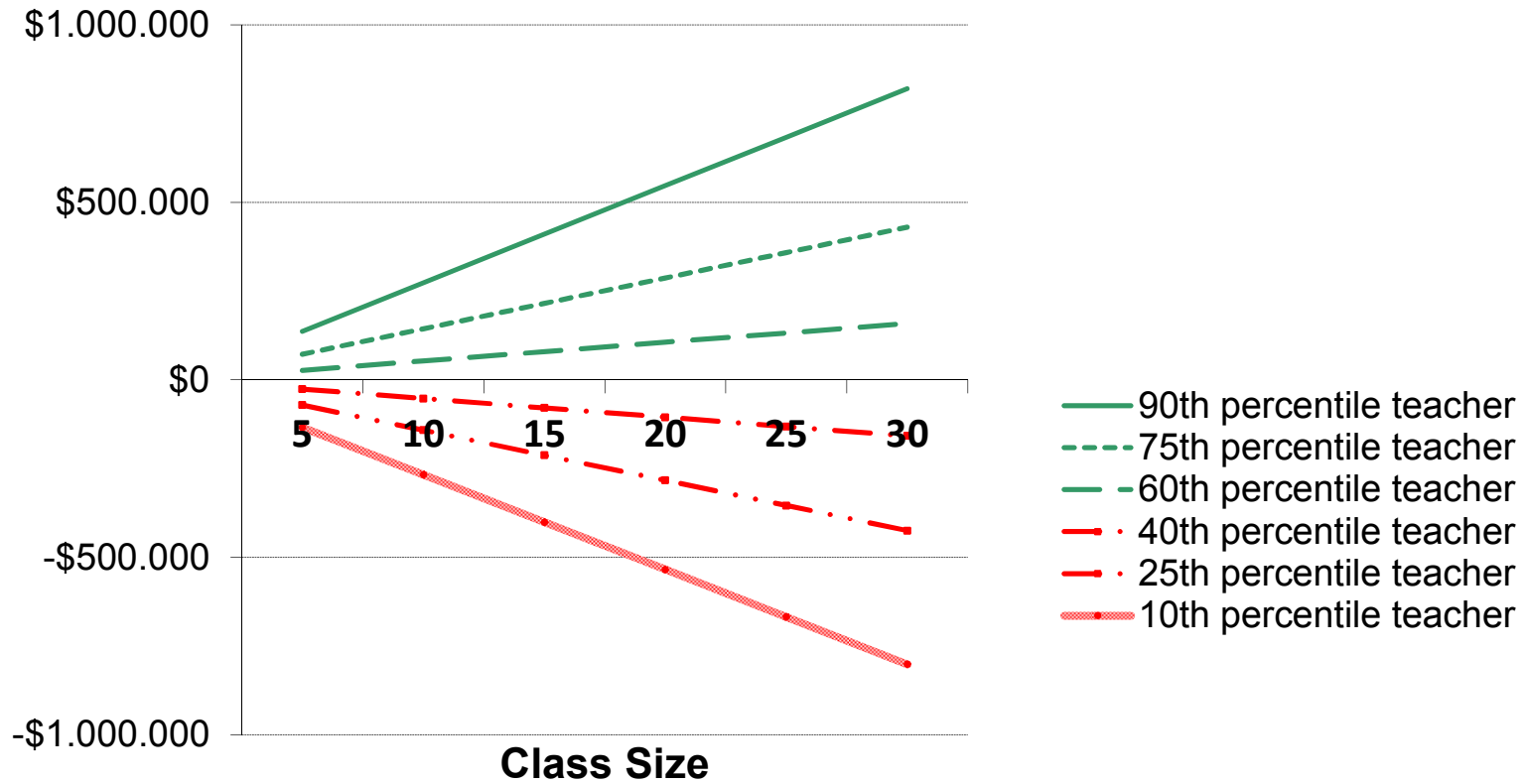
Impact on Student Lifetime Incomes by Class Size and Teacher Effectiveness (compared to average teacher)



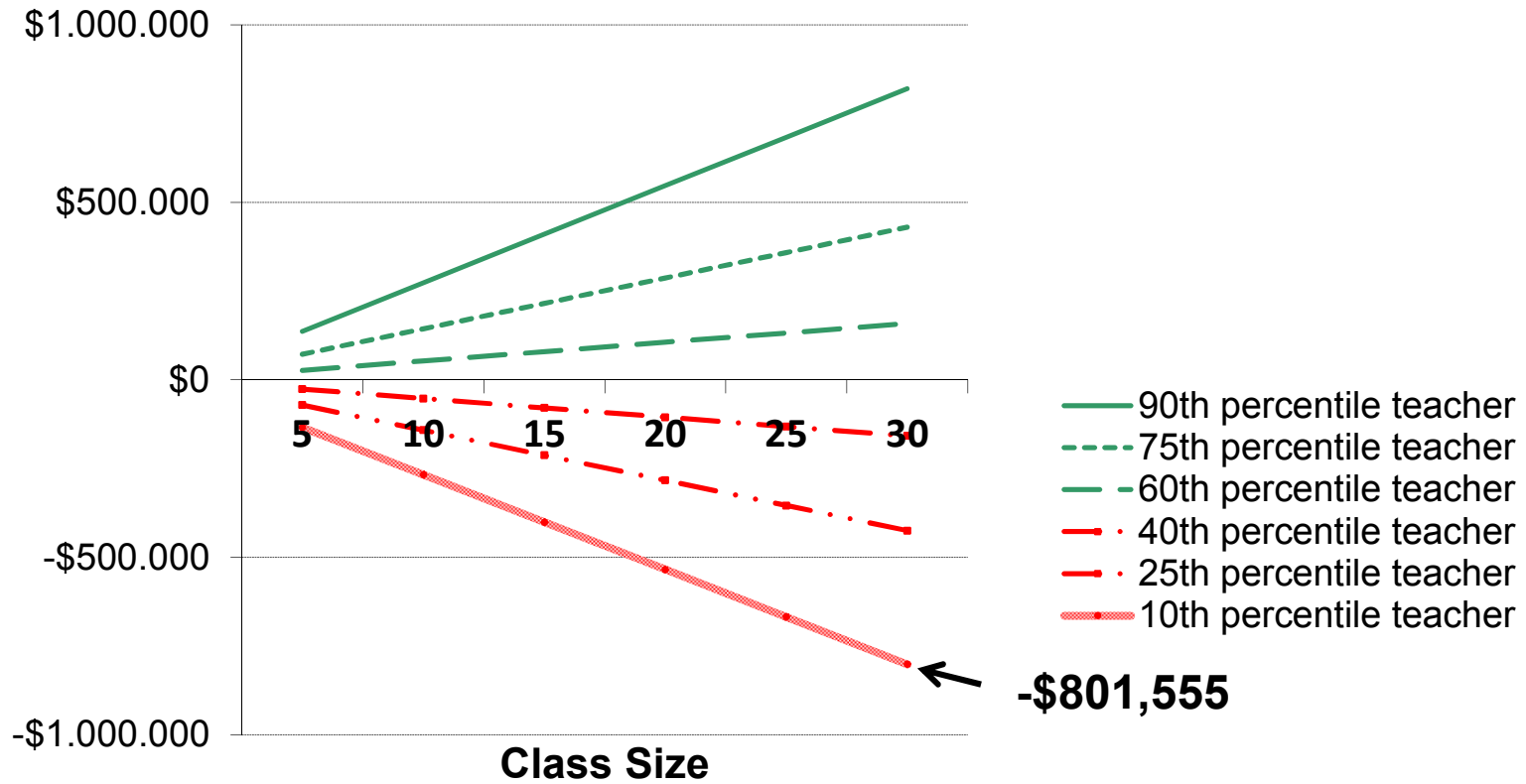
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Economic Value of Teacher 1 s.d. Above Average

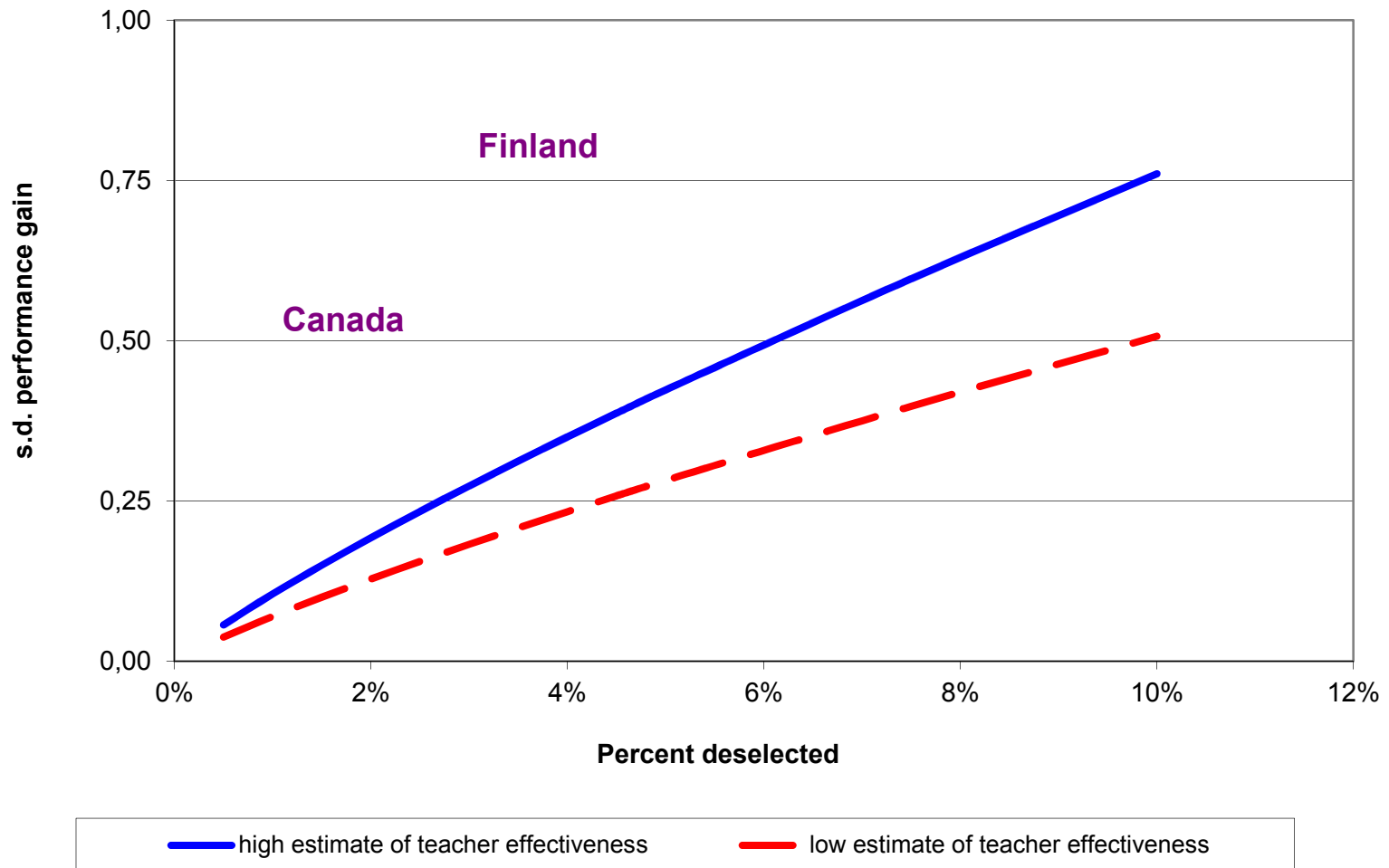
class size	Lower bound	Baseline	Upper bound
	$\theta=0.6, \sigma_T=0.2, \phi=0.13$	$\theta=0.3, \sigma_T=0.2, \phi=0.13$	$\theta=0.3, \sigma_T=0.3, \phi=0.2$
15	\$181,955	\$319,669	\$746,573
20	\$242,607	\$426,225	\$995,431
25	\$303,259	\$532,781	\$1,244,288

Demand for Quality: Teacher Impact through Aggregate Improvement

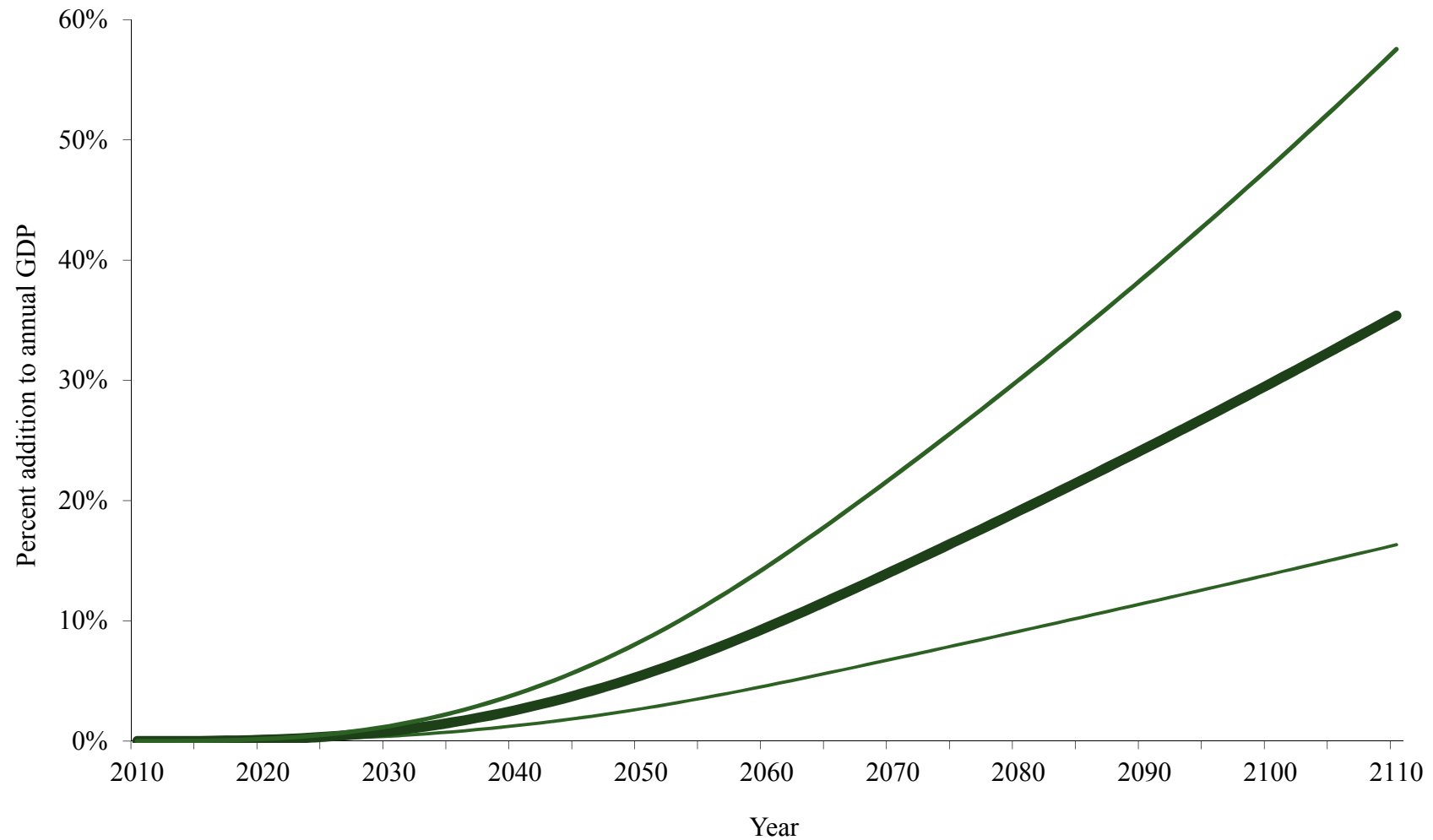
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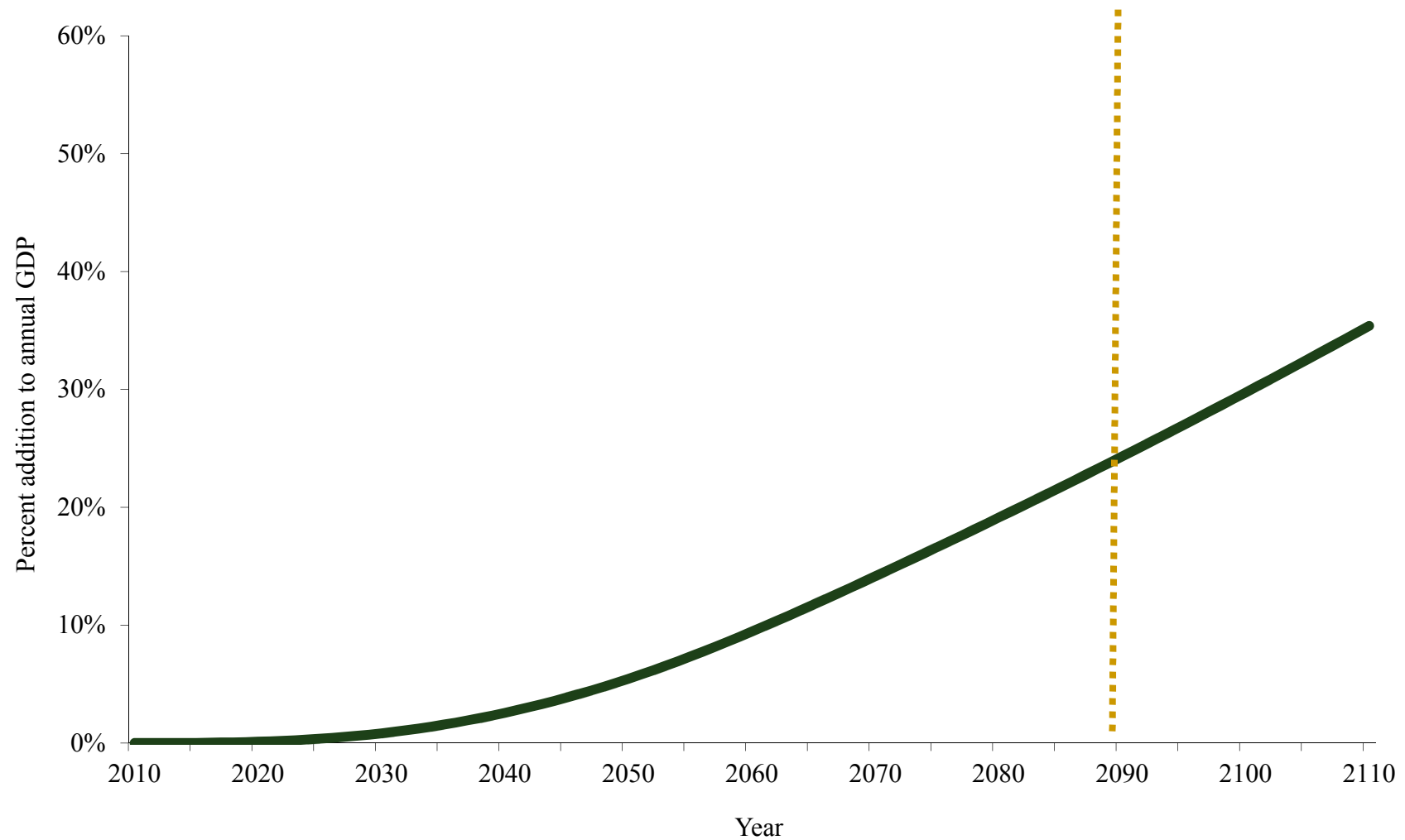
Alternative Estimates of Least Effective Teachers on Student Achievement



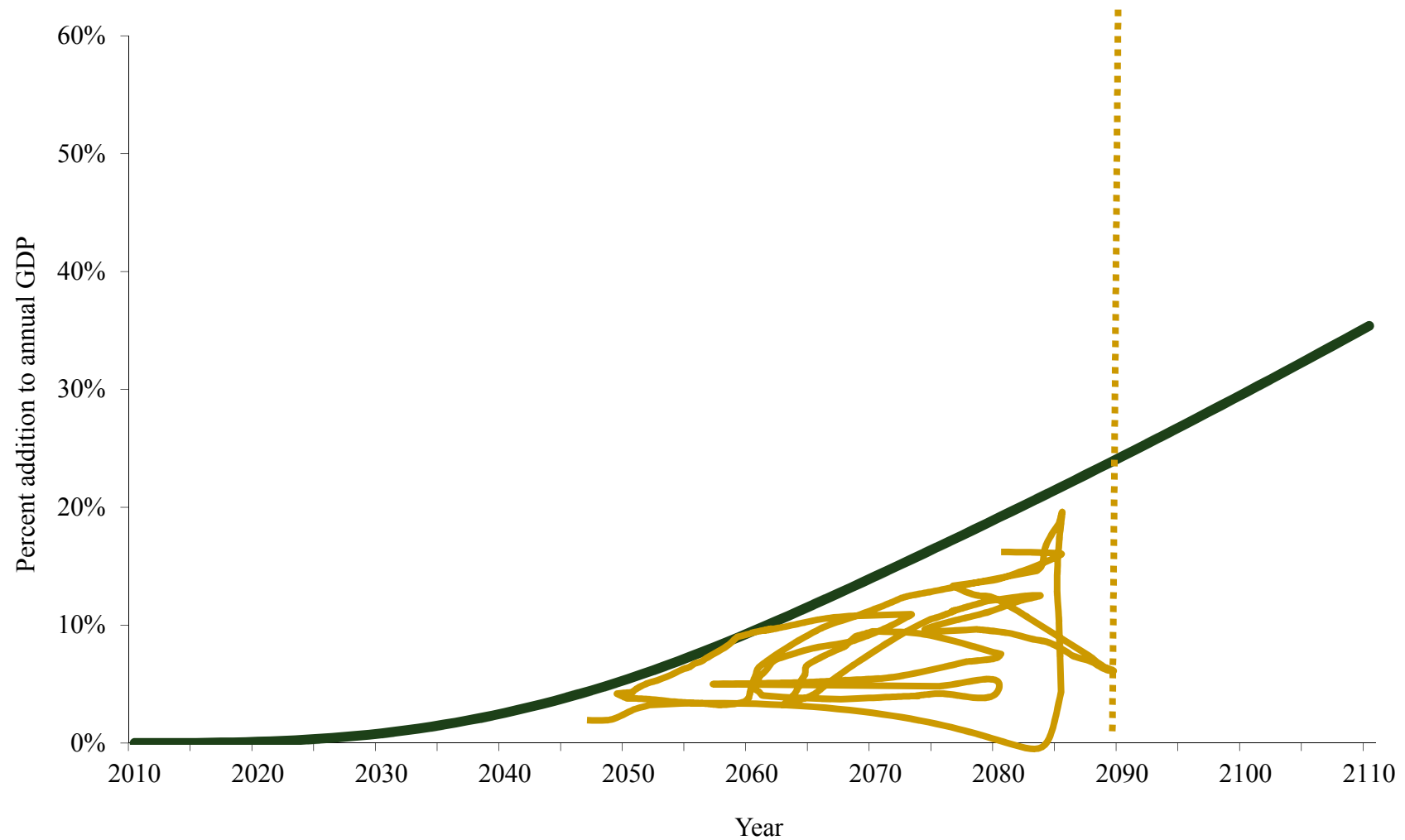
Annual Gains from 25 PISA-Points Improvement (1/4 std. dev.)



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Present Value of Achievement Gains United States

Achievement change	Present value (\$billion)	% GDP
Plus ¼ standard deviation (to Germany; ½ way to Canada)	\$40,647	268%
Achievement = Finland	\$103,073	678%
Eliminate “below level 1” (< 400 PISA)	\$72,101	475%

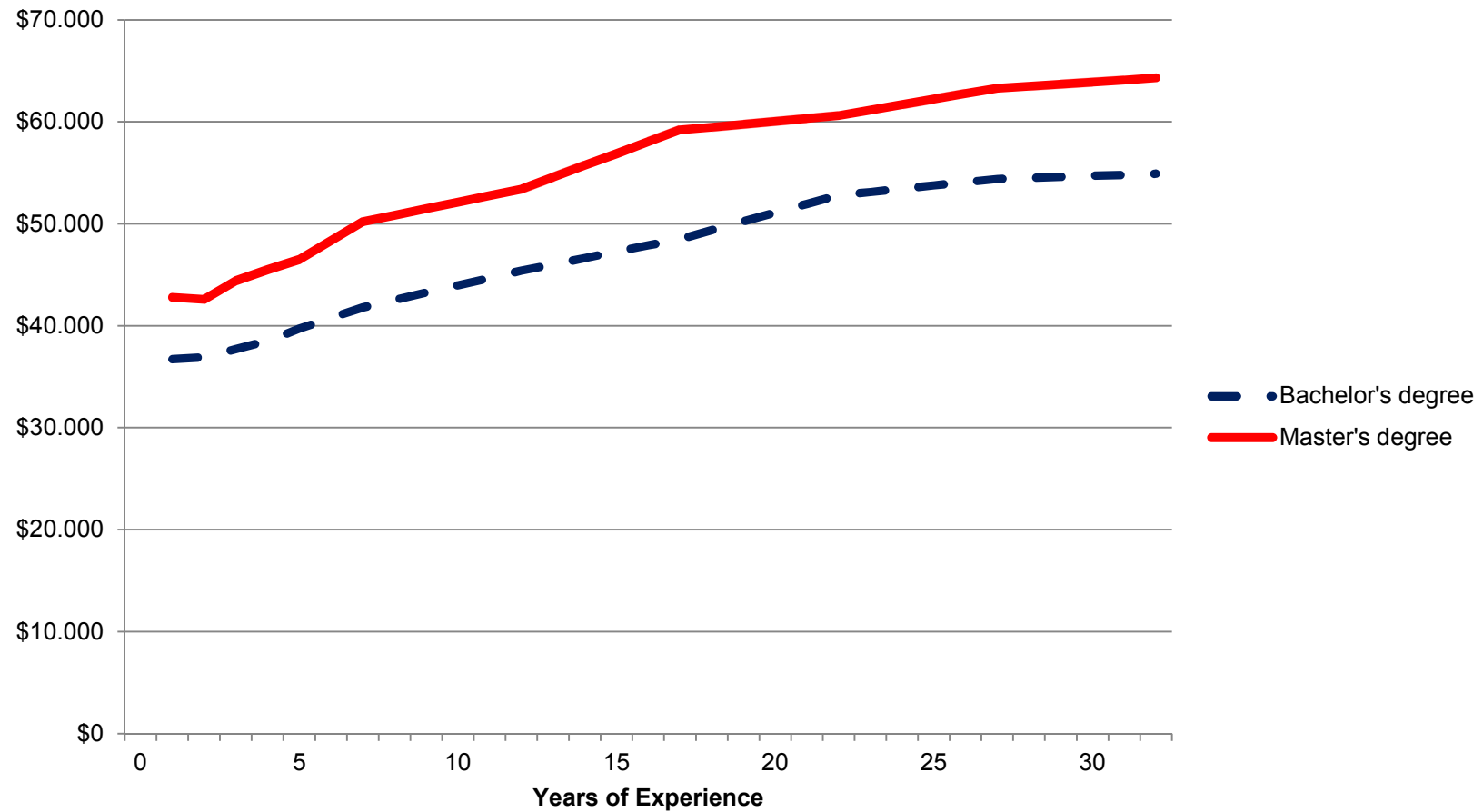
Present Value of Achievement Gains

Spain

Achievement change	Present value (\$billion)	% GDP
Plus ¼ standard deviation (Iceland, Germany)	\$4,496	268%
Achievement = Finland (62 PISA points)	\$12,332	791%
Eliminate “below level 1” (18.3% < 400 PISA)	\$8,237	529%

Inefficiencies in Current Salaries

Average Teacher Salary by Degree and Experience, 2007



Experience and Advanced Degrees

	% of Teachers	% of Salaries
MA or more	53	9.5
Experience > 2 years	85	27

Conclusions

- Gains very large from better teachers
- Difference between effective and ineffective enormous
- Gains justify substantial structural change

Cautions

- Gains only with achievement
 - Gains take long time
 - “too hard” → willing to accept large loss
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