NOVA SCHOOL OF BUSINESS & ECONOMICS
Economics of Education Knowledge Center

Medidas Educativas no Contexto Atual de Falta de Professores

Policy Brief

18 de maio, 2022

Autores:
Luís Catela Nunes
Ana Balcão Reis
Pedro Freitas
Diogo Conceição

Trabalho em Curso

Índice

Introdução

Cerca de 40% dos professores que se encontravam a lecionar nas escolas públicas portuguesas em 2018/19 irão aposentar-se até 2030/31, o que irá acelerar as necessidades de recrutamento de novos docentes nos próximos 10 anos. De acordo com o "Estudo de Diagnóstico de Necessidades Docentes de 2021 a 2030" realizado em 2021 pelo Centro de Economia da Educação da Nova SBE em parceria com a DGEEC, as necessidades de recrutamento de novos docentes serão, em média, de cerca de 3.450 novos docentes por ano, com uma intensificação ao longo do tempo, atingindo cerca de 4.100 novos docentes no ano letivo de 2030/2031 (Gráfico 1).[1]

Neste *Policy Brief* fazemos um enquadramento das necessidades de recrutamento futuras de novos docentes, assim como de algumas características do atual corpo docente em Portugal em comparação com o de outros sistemas de ensino. Apresentamos também alguns dados sumários sobre a evolução recente do desempenho dos alunos portugueses e que devem estar presentes no momento de definir políticas educativas com vista ao recrutamento de novos docentes.

Finalmente, elencamos um conjunto de medidas educativas que têm sido apresentadas e consideradas para mitigar o problema da escassez de professores. Identificamos ainda na literatura científica os estudos realizados no passado sobre políticas similares implementadas em diversos sistemas de ensino, assinalando os seus impactos no recrutamento de docentes e no desempenho dos alunos. O objetivo deste *Policy Brief* não é apontar soluções definitivas para o problema da escassez de professores, mas enquadrar a evidência científica existente sobre o tema.

[1] Nunes, Luís Catela, Ana Balcão Reis, Pedro Freitas, Miguel Nunes, e José Mesquita Gabriel. 2021. Estudo de diagnóstico de necessidades docentes de 2021 a 2030. Direção-Geral de Estatísticas da Educação e Ciência (DGEEC). https://www.dgeec.mec.pt/np4/506/%7B$clientServletPath%7D/?newsId=1305&fileName=DGEEC_Estudo_Diagnostico_de_Necessidade_.pdf.

Necessidades de recrutamento

Portugal enfrentará na próxima década a aposentação de muitos dos professores que hoje se encontram a lecionar nas escolas públicas. Segundo o Perfil do Docente referente ao ano letivo 2019/20 (DGEEC, 2021), mais de 50% dos professores na maioria dos níveis de ensino têm mais de 50 anos.[2] Em resultado desta estrutura etária envelhecida, dos cerca de 120 mil professores existentes em 2018/19, 47 mil já estarão aposentados no ano letivo 2030/31.

A queda demográfica que fará o número de alunos reduzir-se dos 1,1 milhões em 2018/19 para os cerca de 960 mil em 2030/31, correspondendo a uma queda de cerca de 15%, não será suficiente para compensar a redução no número de professores. Será assim necessário recrutar cerca de 34.500 novos professores ao longo dos próximos 10 anos.

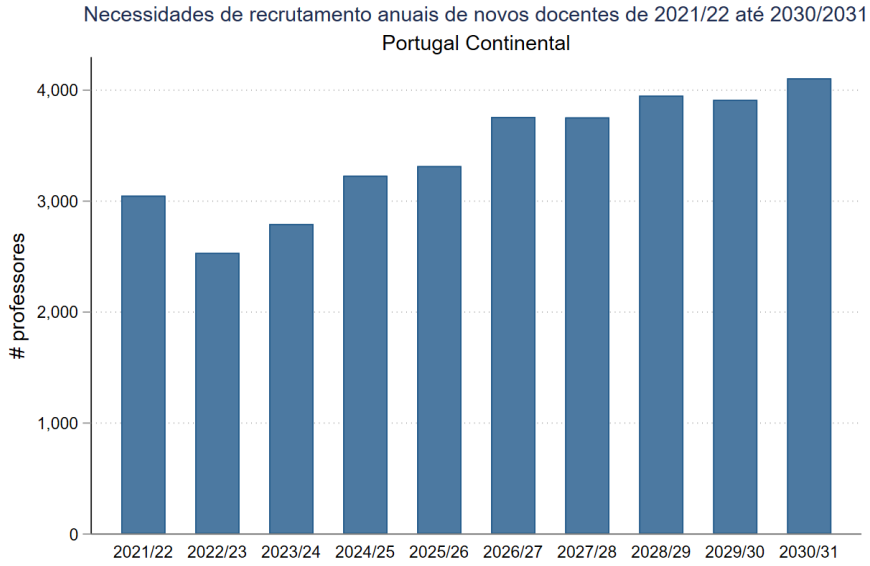


Gráfico 1: Necessidades de recrutamento anuais de novos docentes de 2021/22 até 2030/31, Portugal Continental Fonte: Nunes, et al. (2021)

[2] Direção-Geral de Estatísticas da Educação e Ciência (DGEEC) e Direção de Serviços de Estatísticas da Educação (DSEE). 2021. Perfil do Docente 2019/2020. Direção-Geral de Estatísticas da Educação e Ciência (DGEEC). https://www.dgeec.mec.pt/np4/estatglobal/%7B$clientServletPath%7D/?newsId=148&fileName=DGEEC_DSEE_2021_PerfilDocente201920.pdf

Em termos relativos, como percentagem do número de docentes em 2018/19, as necessidades de recrutamento de novos docentes até 2030/31 são bastante semelhantes nas várias regiões NUTS III, com valores entre 25% e 35% para praticamente todas as regiões, sendo mais baixas nas regiões de Tâmega e Sousa com 19%, Lezíria do Tejo com 23% e mais altas na Beira Baixa com 36% e Terras de Trás-os-Montes com 39% (Gráfico 2).

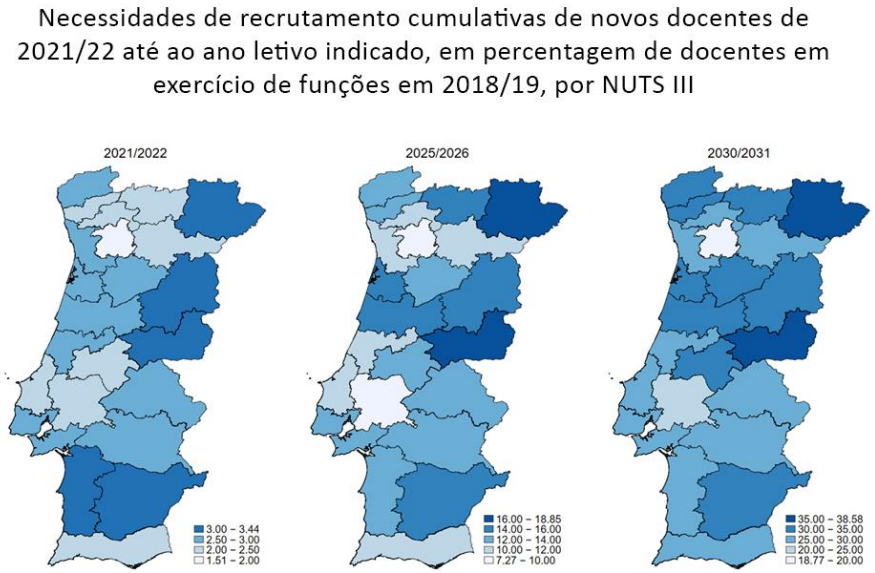


Gráfico 2: Necessidades de recrutamento cumulativas de novos docentes de 2021/22 até ao ano letivo indicado, em percentagem de docentes em exercício de funções em 2018/19, por NUTS III
Fonte: Nunes, et al. (2021)

Desagregando as necessidades pelos diferentes ciclos de ensino (Gráfico 3), conclui-se que:

- O grupo que junta o 3º ciclo do ensino básico e o ensino secundário é aquele que apresenta uma maior necessidade de recrutamento, atingindo o valor de 15.663 novos docentes até 2030/31, o que se justifica pela maior abrangência de anos de ensino;
- O 1º ciclo do ensino básico é o segundo grupo com necessidades de recrutamento mais significativas, num total de 6.926 docentes até 2030/31;
- O 2º ciclo do ensino básico apresenta necessidades de recrutamento de docentes de cerca de 5.655 docentes até 2030/31;
- Quanto à educação pré-escolar, prevê-se que necessite de recrutar 4.419 educadores até 2030/31;
- Para Ensino Especial, Língua Gestual Portuguesa e Educação Moral e Religiosa, do pré-escolar ao ensino secundário, prevê-se a necessidade de recrutar 1.845 novos docentes até 2030/31.

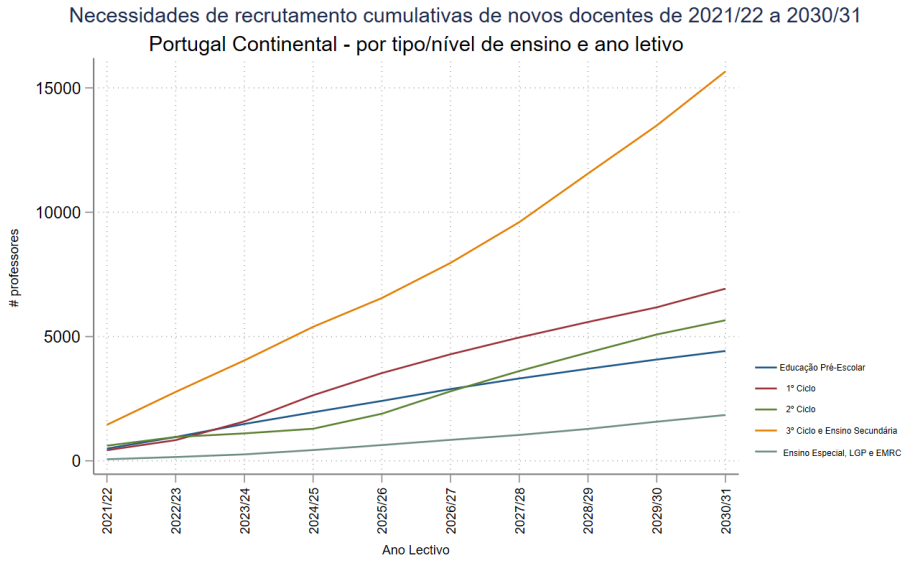


Gráfico 3: Necessidades de recrutamento cumulativas de novos docentes (número) em Portugal Continental, de 2021/22 a 2030/31, por tipo/nível de ensino e ano letivo
Fonte: Nunes, et al. (2021)

O número de diplomados de licenciaturas e mestrados em cursos na área da educação tem-se vindo a reduzir ao longo dos últimos 20 anos (Gráfico 4). O número de diplomados em mestrados na área da formação de docentes foi de cerca de 1.500 em 2018/19, um valor muito inferior às necessidades de recrutamento futuras de 3.425 por ano.[3]

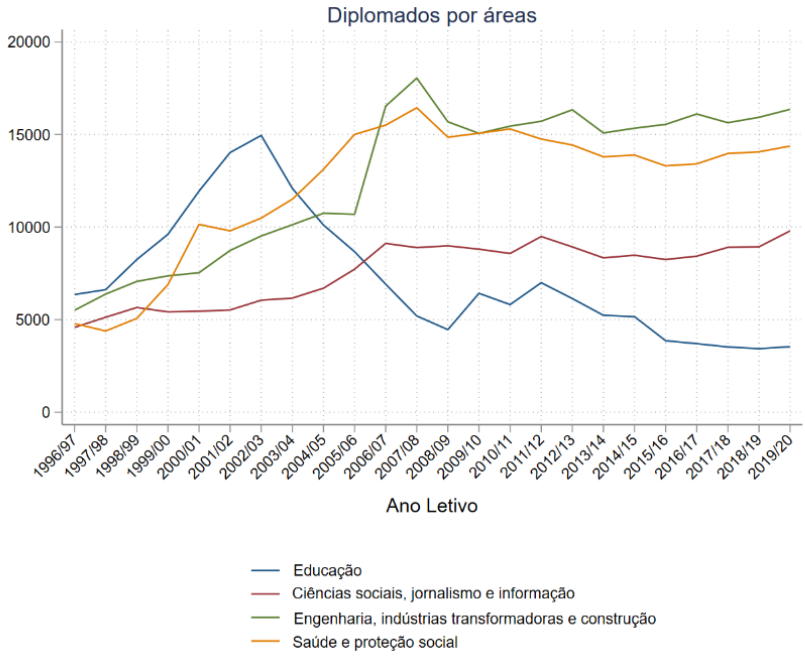


Gráfico 4: Evolução do número de diplomados (de licenciatura e mestrado) por área de estudos, entre os anos letivos 1996/97 e 2019/20
Fonte: Estatísticas – Diplomados em estabelecimentos de ensino superior – 1996/97 a 2019/20, DGEEC

[3] Este valor não inclui as necessidades de docentes para E.M.R.C.

De referir que as projeções aqui citadas foram obtidas a partir de um modelo de oferta e procura de recursos docentes tendo por base as Estatísticas da Educação para 2018/19 que não abarcam o período da pandemia. A implementação dos programas de recuperação de aprendizagens a partir de 2021/22 implica um aumento das necessidades de recrutamento futuras face às projeções apresentadas. Adicionalmente, a descida da idade da reforma em consequência do aumento da mortalidade, irá conduzir a uma antecipação das necessidades de recrutamento em 2023/24. Em sentido contrário, a redução da natalidade levará a uma redução das necessidades de recrutamento na educação pré-escolar a partir de 2024/25.

Condições laborais dos docentes

De acordo com os dados disponibilizados pela *Eurydice*, em Portugal, os salários dos professores estão alinhados com os salários de trabalhadores nos sectores da indústria, construção e serviços fora do setor público, com o mesmo nível de educação (Gráfico 5).[4] No entanto, notamos que esses resultados não têm uma desagregação por idade e que a elevada percentagem de professores perto da idade de aposentação contribui para aumentar o salário médio dos professores portugueses. De sublinhar ainda que esta análise não compara salários de trabalhadores com a mesma qualificação entre países.

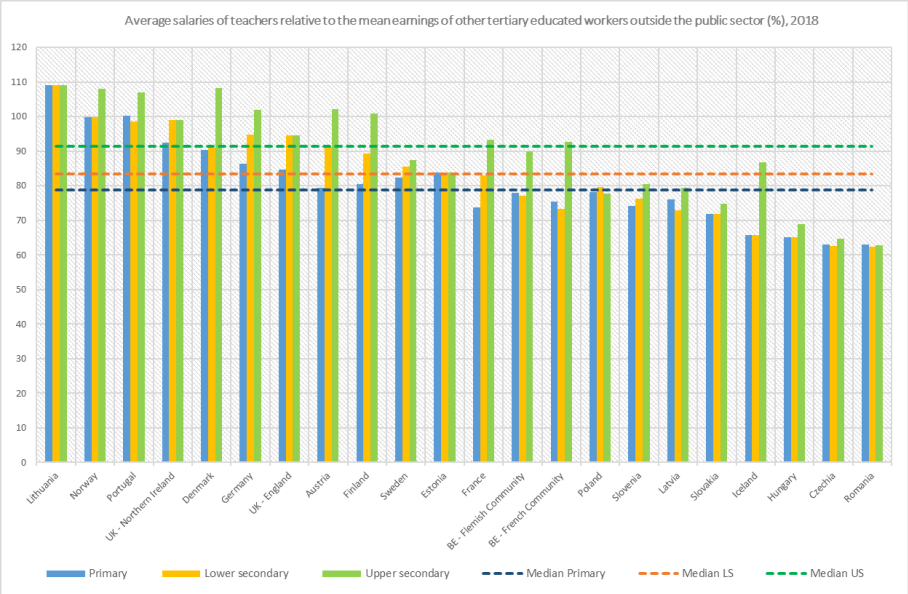
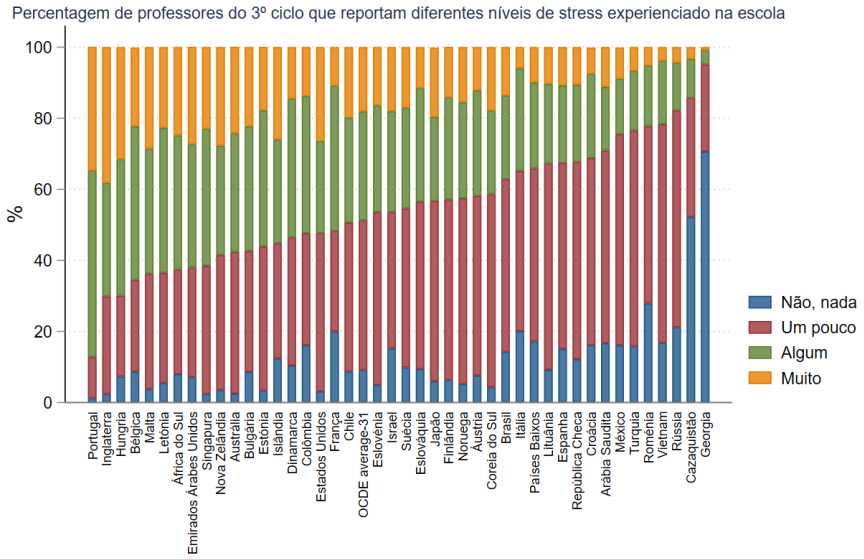


Gráfico 5: Salário médio dos professores relativo aos ganhos médios de outros trabalhadores que frequentaram o Ensino Superior fora do setor público (%), 2018
Fonte: Eurydice para o salário médio dos professores. O ano de referência é 2018/19 exceto para a República Checa, Estónia, Polónia, Portugal e Eslovénia (2017/18), França (2017) e Suécia (2018). Eurostat para os ganhos médios de trabalhadores que frequentaram o Ensino Superior em empresas com mais de 10 empregados na Indústria, Construção e Serviços (exceto administração pública, defesa e segurança social obrigatória), 2018.

[4] Piedrafita, Sonia. 2020. Focus on: Is teaching a high-paying career? 14 December. https://eacea.ec.europa.eu/national-policies/eurydice/content/focus-teaching-high-paying-career_en.

No inquérito TALIS 2018 (*Teaching and Learning International Survey, TALIS*) desenvolvido pela OCDE, foram inquiridos 3.676 professores do 3º ciclo do ensino básico de 200 escolas em Portugal sobre as suas condições de trabalho.[5] Os resultados mostram que mais de 30% dos professores experienciou níveis de stress elevado no seu local de trabalho (Gráfico 6). Estes resultados estão alinhados com aqueles reportados em Varela et al. (2018), em que num inquérito a mais de 15 mil professores do ensino público e privado, cerca de 16% apresentava valores críticos de exaustão emocional.[6]



tttttt

Gráfico 6: Percentagem de professores de 3º ciclo que reportam diferentes níveis de stress experienciado na escola
Fonte: OCDE (2019)

[5] OCDE. 2019. TALIS 2018 Results : Teachers and School Leaders as Lifelong Learners. OECD Publishing https://www.oecd.org/education/talis/.
[6] Varela, Raquel Cardeira, Roberto della Santa, Henrique Silveira, Coimbra de Matos, Duarte Rolo, João Areosa e Roberto Leher. 2018. Inquérito Nacional sobre as Condições de Vida e Trabalho na Educação em Portugal (INCVTE). Jornal da FENPROF. https://raquelcardeiravarela.files.wordpress.com/2020/01/jf_incvte_20182.pdf

Uma das principais fontes de *stress* apontada pelos professores é o trabalho administrativo que é reportado por quase 80% dos professores portugueses inquiridos no *TALIS*, o maior valor entre os países participantes no estudo da OCDE (Gráfico 7). No entanto, o número total de horas semanais reportadas por professores portugueses alocadas a trabalho administrativo são de 2,7 horas, o que está em linha com a média da OCDE que é de 2,8 (OCDE, 2019).

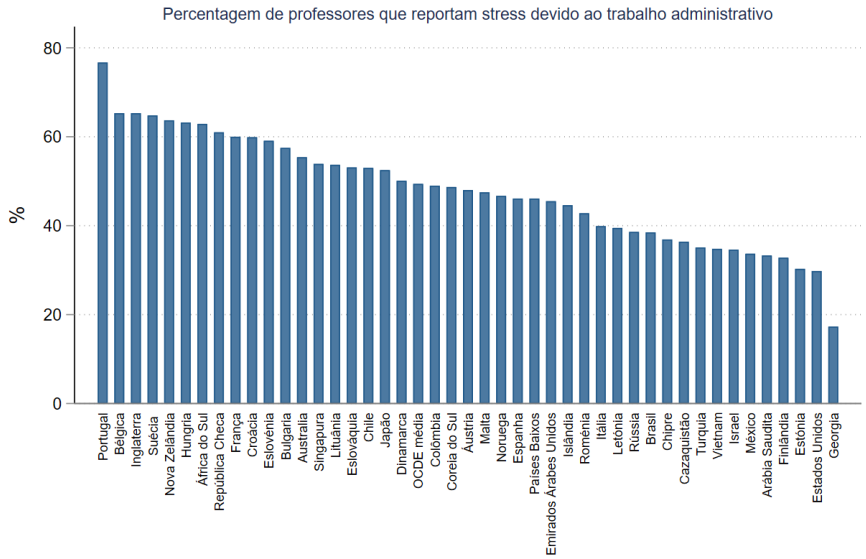


Gráfico 7: Percentagem de professores que reportam stress devido a trabalho administrativo
Fonte: OCDE (2019)

Apesar destes índices elevados de stress, entre os países participantes no TALIS, Portugal é aquele com uma menor taxa de professores a reportar que planeiam sair da carreira nos próximos cinco anos, cerca de 10% (Gráfico 8).

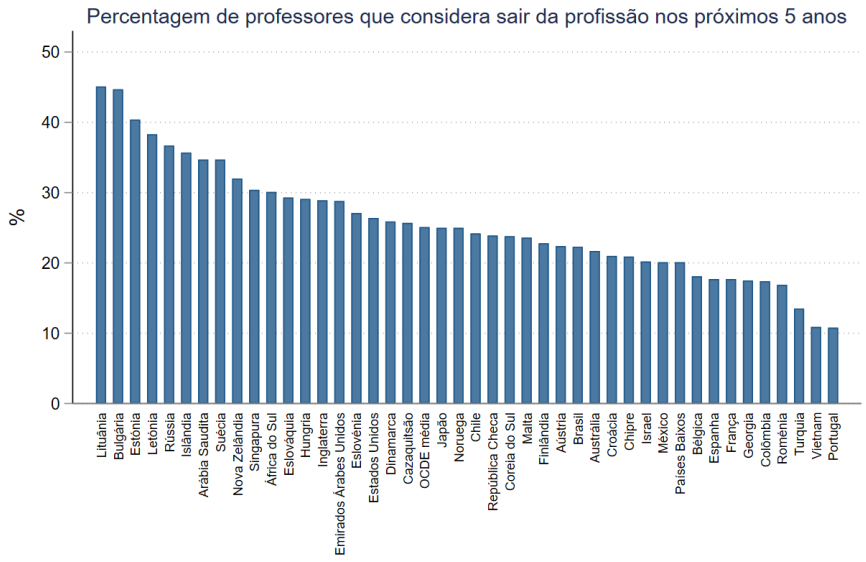


Gráfico 8: Percentagem de professores que considera sair da profissão nos próximos 5 anos
Fonte: OCDE (2019)

Desigualdades no sistema público de ensino

A falta de professores no sistema de ensino português acontece após um longo período de progresso dos resultados dos alunos portugueses. Considerando os resultados nos testes do PISA, realizados pela OCDE a alunos com 15 anos de idade em vários países, Portugal melhorou sustentadamente os seus resultados nos três domínios de Leitura, Ciências e Matemática entre 2000 e 2018. Contudo, e apesar desta progressão, a diferença de resultados entre os alunos das famílias 25% mais e menos favorecidas economicamente, manteve-se estável em torno dos 100 pontos (Gráfico 9).

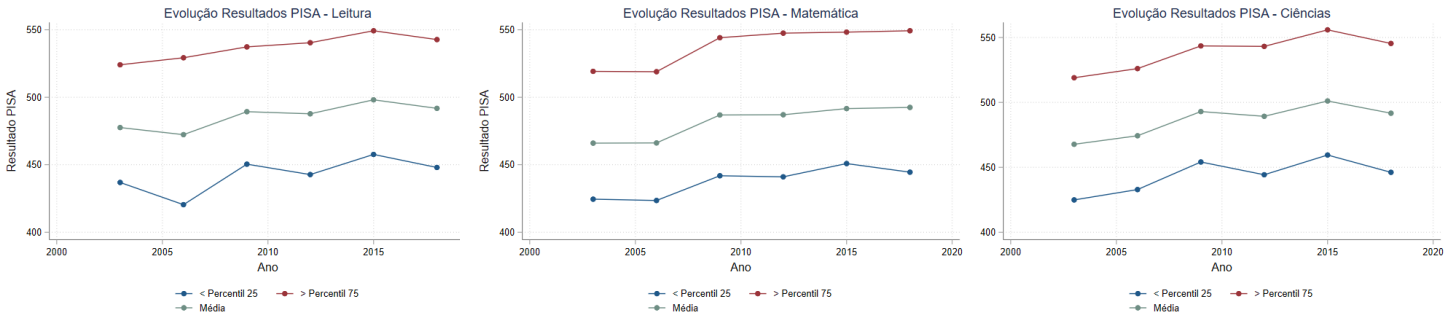


Gráfico 9: Evolução dos resultados do PISA nas vertentes da Leitura, Matemática e Ciências
Fonte: Esteves et al. (2021)

Esta desigualdade é espelhada nos resultados nas provas finais de 4º, 6º e 9º ano. Por exemplo, cerca de 30% dos alunos cujas mães não concluíram o ensino superior têm uma nota negativa no exame de matemática no final do 9º ano, contrastando com menos de 15% entre os alunos cujas mães concluíram o ensino superior. Por sua vez, a probabilidade de um aluno cuja mãe concluiu o ensino superior obter o nível máximo de 5, é cerca de três vezes maior do que para um aluno cuja mãe não tem o ensino superior (Gráfico 10).[7]

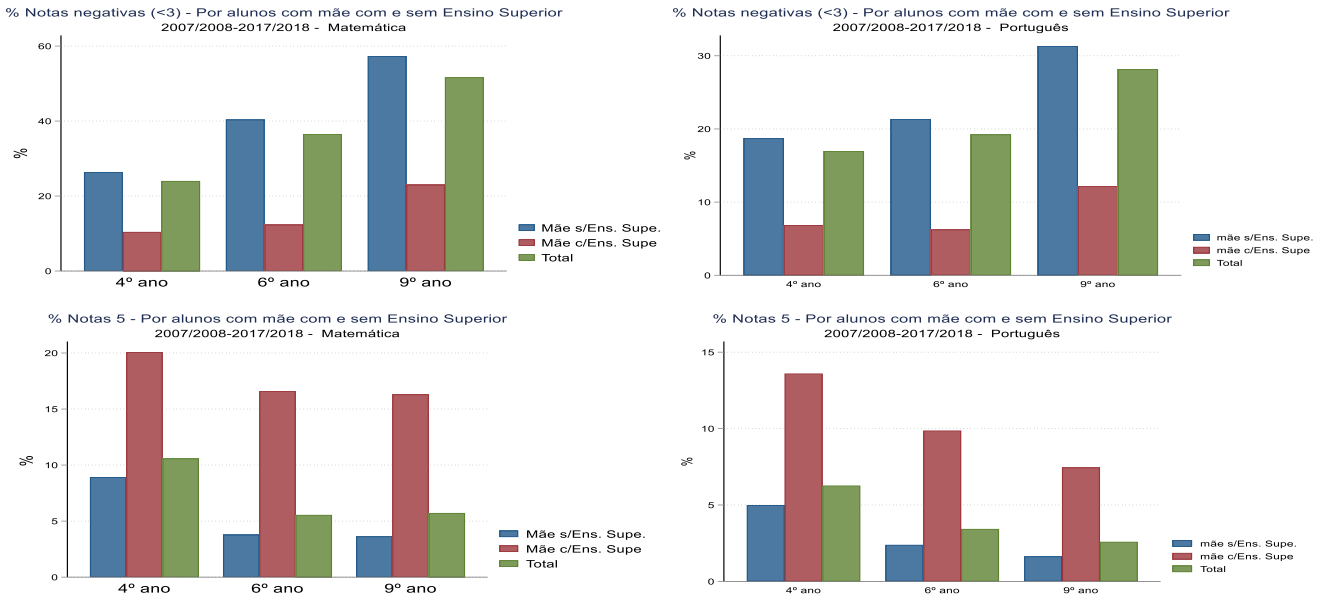


Gráfico 10_ Percentagem de notas negativas e máximas nas disciplinas de Matemática e Português, por alunos com mãe que frequentaram e que não frequentaram o Ensino Superior, de 2007/08 a 2017/18
Fonte: Esteves et al. (2021)

[7] Esteves, M., Pedro Freitas, Miguel Herdade, Bruno P. Carvalho, and Susana Peralta. 2021. Crianças em Portugal e ensino a distância: um retrato. Zenodo. https://zenodo.org/record/4507917#.YoOn5OjMK3A

Segundo Loura (2022) a prevalência da falta de professores levará a que, na ausência de alterações nas regras de contratação, em 2022/23 cerca de 100 mil alunos entre o 7º e o 12º ano não tenham professor a pelo menos uma disciplina, sendo que este valor pode chegar aos 250 mil alunos daqui a 3 anos.[8] Períodos prolongados de falta de professores têm mostrado ter impactos negativos de curto e longo prazo sobre os resultados dos alunos. Patrinos et al.(2022) compila a evidência já existente acerca dos impactos devido ao encerramento de escolas durante a pandemia, concluindo que os alunos perderam, em média, meio ano útil de aprendizagem devido ao encerramento de escolas.[9] Outros estudos que avaliam o impacto de encerramentos prolongados de escolas por motivos de greve (Jaume e Willén, 2019 e Belot e Webbink, 2010) ou devido a fenómenos climáticos (Goodman, 2014) encontram impactos significativos da ausência prolongada de aulas no aproveitamento dos alunos, na probabilidade de repetir um determinado ano e até mais tarde quando os alunos transitam para o mercado de trabalho.[10] [11] [12]

A possibilidade de muitos alunos poderem ficar sem aulas nos próximos anos letivos devido à falta de professores acontece depois de dois anos de perdas relevantes de aprendizagens causadas pela pandemia. Estas perdas acentuaram as desigualdades já existentes no sistema público antes da pandemia. Neste contexto é relevante o levantamento de medidas que têm vindo a ser propostas como resposta a esta situação. Pretendemos contribuir para a discussão pública sobre este tema elencando diversas políticas que têm sido identificadas, indicando a evidência científica existente sobre os seus impactos quer no recrutamento e retenção de professores, quer nas aprendizagens dos alunos.

[8] Loura, Luísa. 2022. "Quantos alunos estarão sem aulas daqui a 1 ano?". Fundação Francisco Manuel dos Santos. https://www.ffms.pt/blog/artigo/578/quantos-alunos-estarao-sem-aulas-daqui-a-1-ano
[9] Patrinos, Harry Anthony, Emiliana Vegas, and Rohan Carter-Rau. 2022. "An Analysis of COVID-19 Student Learning Loss." Policy Research Working Paper. https://openknowledge.worldbank.org/bitstream/handle/10986/37400/IDU00f3f0ca808cde0497e0b88c01fa07f15bef0.pdf?sequence=1.
[10] Jaume, David, and Alexander Willén. 2019. "The Long-Run Effects of Teacher Strikes: Evidence from Argentina." Journal of Labor Economics 37: 1097-1139. https://doi.org/10.1086/703134.
[11] Belot, Michèle, and Dinand Webbink. 2010. "Do Teacher Strikes Harm Educational Attainment of Students?" LABOUR 24 (4): 391-406. https://doi.org/10.1111/j.1467-9914.2010.00494.x.
[12] Goodman, Joshua. 2014. "Flaking Out: Student Absences and Snow Days as Disruptions of Instructional Time." NBER Working Paper. http://www.nber.org/papers/w20221.

Sistematização da evidência científica

Abaixo elencamos um conjunto de políticas educativas que têm sido apresentadas e consideradas para gerir a escassez de professores. Agrupamos estas políticas em diferentes tipos de medidas, nomeadamente:

- Incentivos financeiros e contratuais;
- Professores em idade de aposentação;
- Mentoria;
- Incentivos não monetários;
- Organização não letiva;
- Organização letiva;
- Recrutamento de professores.

Consideramos também um cenário base no qual não são adotadas quaisquer medidas para fazer face à escassez de professores prevista para os próximos 10 anos. Neste cenário, segundo Loura (2022), já no ano letivo 2022/23 cerca de 110.000 alunos do 7º ao 12º ano estarão sem aulas a pelo menos uma disciplina. Este é o cenário com o qual devem ser comparados os resultados de todas as medidas que elencamos.

Para cada um destes temas, identificamos na literatura científica estudos empíricos que permitem estabelecer uma relação causal entre as políticas analisadas e os seus impactos sobre o recrutamento de docentes e/ou sobre os resultados dos alunos. Excluímos estudos com uma vertente correlacional que não permitem estabelecer relações de causa-efeito.

Esta evidência científica é sumariada na Tabela 1 em que os impactos das políticas são avaliados em três domínios: 1. Impacto na Atração/Retenção de Professores; 2. Impacto nas Aprendizagens dos Alunos e 3. Impacto Orçamental. No impacto orçamental são considerados apenas os custos financeiros diretos de implementação de cada uma das políticas, não se incluindo benefícios que possam resultar da sua adoção no médio/longo-prazo.

Tendo em conta a literatura existente, os dois primeiros domínios são classificados na seguinte escala:

- ⊕ - Impacto positivo;
- ○ - Impacto nulo;
- ⊖ - Impacto negativo;
- ? - Impacto desconhecido.

O último domínio, referente ao Impacto Orçamental, é classificado com a seguinte escala:

-  - Impacto orçamental baixo ou nulo;
-  - Impacto orçamental moderado;
-  - Impacto orçamental elevado.

Tabela 1: Resumo das medidas propostas e do seu impacto.
Fonte: Autores

Tipos de Medida	Medida	Impacto na Atração/Retenção de Professores	Impacto nas Aprendizagens dos Alunos	Impacto Orçamental	Observações
Cenário Base	**Sem medidas adicionais de recrutamento de docentes**	⊖	⊖	🪙	Baseado em estudos sobre os impactos de períodos prolongados sem aulas.
Incentivos Financeiros e Contratuais	**Aumentar Incentivos Financeiros: Salário**	⊕	○ ⊕	🪙🪙	Os estudos existentes consideram diversas alterações à estrutura salarial.
	Aumentar Incentivos Financeiros: Subsídios Alojamento/ Transporte	?	?	?	A evidência deste tipo de incentivos é limitada e baseia-se em trabalhos descritivos com amostras pequenas.
	Aumentar Estabilidade do Corpo Docente nas Escolas (Duração, Geografia, Tipo de Contrato, Etc.)	⊕	⊕	🪙	A literatura não distingue entre casos em que uma maior estabilidade pode ser alcançada através do prolongamento dos contratos ou da efetivação de professores nas escolas.
	Pagar Horas Extraordinárias aos Docentes Atuais	?	?	🪙	Não existe evidência que avalie os custos e benefícios de situações alternativas entre uma maior sobrecarga do corpo docente e a existência de alunos sem aulas.
	Estagiários Remunerados	?	?	🪙	-

Professores em Idade de Aposentação	**Recrutamento de Professores Aposentados com Horário Letivo Reduzido e para Outras Tarefas**	?	?	?	-
	Alocação de Professores em Idade de Aposentação com Horário Letivo Reduzido a Outras Tarefas	?	?	?	-
Mentoria	**Acompanhamento de Proximidade aos Novos Professores na Escola**	+	+		-
Incentivos Não Monetários	**Reconhecimentos e Distinções**	?	+		Evidência escassa.
Organização Não Letiva	**Redução da burocracia**	?	?	?	A maioria dos estudos existentes são puramente correlacionais.
	Reforço Pessoal Não Docente (Técnicos / Psicólogos / Administrativos / Assistentes Escolares)	?	+		-

Organização Letiva	**Permitir Mais Alunos por Turma**	?	− ○	🪙	Não existe evidência que avalie os custos e benefícios de situações alternativas entre os alunos estarem numa turma maior e a existência de alunos sem aulas. Neste caso, podem existir impactos positivos resultantes de evitar que alguns alunos não tenham aulas.
	Reduzir Carga Horária dos Alunos	?	−	🪙	-
	Reduzir Atividades Não Letivas (apoios, tutorias, mentorias, projetos, etc. …)	?	−	🪙	-
Recrutamento de Professores	**Antecipação de Concursos de Colocação**	?	?	🪙	-
	Maior Autonomia de Escola no Recrutamento	+	+	🪙	São considerados estudos sobre a autonomia na seleção dos docentes e na fixação dos salários.
	Concursos para Docentes com Outras Habilitações + Cursos de Qualificação	+	− ○ +	🪙	Os resultados dependem de várias condicionantes, nomeadamente das formações alternativas consideradas.
	Não Penalizar Docentes que Desistiram da Colocação	?	?	🪙	-

Evidência científica

Na Tabela 2 apresentamos para cada uma das medidas consideradas na Tabela 1 as referências bibliográficas aos estudos com a evidência científica acerca do impacto das diferentes políticas consideradas. Os resumos (*abstracts*) são apresentados na secção seguinte.

Notamos que para várias das medidas consideradas existe um conjunto alargado de evidência científica sobre os seus impactos, mas que noutros casos a evidência é escassa ou mesmo inexistente.

Tabela 2: Resumo da evidência científica na base do impacto esperado pelas medidas propostas.
Fonte: Autores

Tipos de Medida	Medida	Referências na Literatura
Cenário Base	**Sem medidas adicionais de recrutamento de docentes**	(Jaume and Willén 2019) (Monroy-Gómez-Franco, Vélez-Grajales and López-Calva 2022) (Belot and Webbink 2010) (Patrinos, Vegas and Carter-Rau 2022) (Maldonado and De Witte 2022) (Goodman 2014)
Incentivos Financeiros e Contratuais	**Aumentar Incentivos Financeiros: Salário**	(Hendricks 2014) (See, et al. 2020) (Bobba, et al. 2022) (Feng and Sass 2018) (Bueno and Sass 2018) (Sims and Benhenda 2022) (Springer, et al. 2010) (Fryer 2013) (de Ree, et al. 2018) (Correa, Parro and Reyes 2015) (Johnston 2020) (Britton and Propper 2016) (Biasi 2021)
	Aumentar Incentivos Financeiros: Subsídios Alojamento/ Transporte	(See, et al. 2020)
	Aumentar Estabilidade do Corpo Docente nas Escolas (Duração, Geografia, Tipo de Contrato, Etc.)	(Hanushek, Rivkin and Schiman 2016) (Gibbons, Scrutinio and Telhaj 2021) (Atteberry, Loeb e Wyckoff 2017)
	Pagar Horas Extraordinárias aos Docentes Atuais	
	Estagiários Remunerados	
Professores em Idade de Aposentação	**Recrutamento de Professores Aposentados com Horário Letivo Reduzido a Outras Tarefas**	
	Alocação de Professores em Idade de Aposentação com Horário Letivo Reduzido a Outras Tarefas	

Mentoria	**Acompanhamento de Proximidade aos Novos Professores na Escola**	(Gibbons, Scrutinio and Telhaj 2021) (Goldhaber, Krieg and Theobald 2020) (Papay, et al. 2020) (Rockoff 2008)
Incentivos Não Monetários	**Reconhecimentos e Distinções**	(Cotofan 2021)
	Resolver Problemas de Indisciplina nas Aulas / Violência nas Escolas	
Organização Não Letiva	**Redução da Burocracia**	(D. Boyd, P. Grossman, et al. 2011) (See, et al. 2020)
	Reforço Pessoal Não Docente (Técnicos / Psicólogos / Administrativos / Assistentes Escolares)	(Carrell and Hoekstra 2014) (Mulhern 2020) (Hemelt, Ladd and Clifton 2021) (Abrahamsen, Ginja and Riise 2021)
Organização Letiva	**Permitir Mais Alunos por Turma**	(Angrist and Lavy 1999) (Angrist, Battistin and Vuri 2017) (Angrist, Lavy and Leder-Luis, et al. 2019) (Hoxby 2000) (Fredriksson, Öckert and Oosterbeek 2013) (Jepsen and Rivkin 2009) (Krueger 1999) (Krueger and Whitmore 2001)
	Reduzir Carga Horária dos Alunos	(Rivkin and Schiman 2015) (Cortes, Goodman and Nomi 2015) (Lavy 2015)
	Reduzir Atividades Não Letivas (apoios, tutorias, mentorias, projetos, etc. …)	(Guryan, et al. 2021) (Nickow, Oreopoulos and Quan 2020)
Recrutamento de Professores	**Antecipação de Concursos de Colocação**	
	Maior Autonomia de Escola no Recrutamento	(Hanushek, Rivkin and Schiman 2016) (Burgess, Greaves and Murphy 2022) (Gibbons, Scrutinio and Telhaj 2021) (Feng and Sass 2018) (Barbieri, Rossetti and Sestito 2011) (Hanushek, Link and Woessmann 2013) (Britton and Propper 2016) (Biasi 2021)
	Concursos para Docentes com Outras Habilitações + Cursos Qualificação	(D. Boyd, P. Grossman, et al. 2012) (Antecol, Eren and Ozbeklik 2013) (Penner 2016) (Whitford, Zhang e Katsiyannis 2018) (Xu, Hannaway and Taylor 2011)
	Não Penalizar Docentes que Desistiram Colocação	

Compilação dos sumários (*abstracts*) dos estudos considerados

Apresentamos de seguida uma compilação dos sumários (*abstracts*) dos artigos acima referidos nas Tabela 2. Pela natureza da compilação, estes são apresentados na sua língua original.

Referência: (Abrahamsen, Ginja and Riise 2021)

Título: "School Health Programs: Education, Health, and Welfare Dependency of Young Adults"

Sumário: This paper provides new evidence that preventive health care services delivered at schools and provided at a relatively low cost have positive and lasting impacts. We use variation from a 1999-reform in Norway that induced substantial differences in the availability of health professionals across municipalities and cohorts. In municipalities with one fewer school nurse per 1,000 school-age children before the reform there was an increase in the availability of nurses of 35% from the pre- to the post-reform period, attributed to the policy change. The reform reduced teenage pregnancies and increased college attendance for girls. It also reduced the take-up of welfare benefits by ages 26 and 30 and increased the planned use of primary and specialist health care services at ages 25-35, without impacts on emergency room admissions. The reform also improved the health of new-borns of affected new mothers and reduced the likelihood of miscarriages.

Referência: (Angrist and Lavy 1999)

Título: "Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement"

Sumário: The twelfth century rabbinic scholar Maimonides proposed a maximum class size of 40. This same maximum induces a nonlinear and nonmonotonic relationship between grade enrollment and class size in Israeli public schools today. Maimonides' rule of 40 is used here to construct instrumental variables estimates of effects of class size on test scores. The resulting identification strategy can be viewed as an application of Donald Campbell's regression-discontinuity design to the class-size question. The estimates show that reducing class size induces a significant and substantial increase in test scores for fourth and fifth graders, although not for third graders.

Referência: (Angrist, Battistin and Vuri 2017)

Título: "In a Small Moment: Class Size and Moral Hazard in the Italian Mezzogiorno"

Sumário: Instrumental variables (IV) estimates show strong class-size effects in Southern Italy. But Italy's Mezzogiorno is distinguished by manipulation of standardized test

scores as well as by economic disadvantage. IV estimates suggest small classes increase manipulation. We argue that score manipulation is a consequence of teacher shirking. IV estimates of a causal model for achievement as a function of class size and score manipulation show that class-size effects on measured achievement are driven entirely by the relationship between class size and manipulation. These results illustrate how consequential score manipulation can arise even in assessment systems with few accountability concerns.

Referência: (Angrist, Lavy and Leder-Luis, et al. 2019)

Título: "Maimonides' Rule Redux"

Sumário: We use Maimonides' rule as an instrument for class size in large Israeli samples from 2002–2011. In contrast with Angrist and Lavy (1999), newer estimates show no evidence of class size effects. The new data also reveal enrolment manipulation near Maimonides cut-offs. A modified rule that uses birthdays to impute enrolment circumvents manipulation while still generating precisely estimated zeros. In both old and new data, Maimonides' rule is unrelated to socioeconomic characteristics conditional on a few controls. Enrolment manipulation therefore appears to be innocuous. We briefly discuss possible explanations for the disappearance of Israeli class size effects since the early 1990s.

Referência: (Antecol, Eren and Ozbeklik 2013)

Título: "The effect of Teach for America on the distribution of student achievement in primary school: Evidence from a randomized experiment"

Sumário: Using data from a randomized experiment and fixed effect quantile regression (FEQR), we examine the effects of having a TFA teacher on test scores across the entire achievement distribution of primary school students in disadvantaged neighbourhoods. While we generally find that TFA teachers neither help nor hurt students in terms of reading test scores, we find positive and statistically significant effects of TFA across the math achievement distribution for the full sample and the effects are fairly uniform. We find a similar distributional effect of TFA within student gender, although the FEQR estimates for female students are two to three times larger than for male students. We also find that there is evidence of heterogeneity in the effects of TFA for Hispanic and black students and for students taught by novice teachers. Finally, we find that the effect of TFA is homogeneous across the math achievement distribution irrespective of certification type.

Referência: (Atteberry, Loeb e Wyckoff 2017)

Título: "Teacher Churning: Reassignment Rates and Implications for Student Achievement"

Sumário: Educators raise concerns about what happens to students when they are exposed to new or new-to-school teachers. However, even when teachers remain in the same school, they can switch roles by moving grades and/or subjects. We use panel data from New York City to compare four ways in which teachers are new to assignment: new to teaching, new to district, new to school, or new to subject/grade. We find negative effects of having a churning teacher of about one third the magnitude of the effect of a new teacher. However, the average student is assigned to churning teachers four times more often than to new teachers, and historically underserved students are slightly more likely to be assigned to churning teachers.

Referência: (Barbieri, Rossetti and Sestito 2011)

Título: "The determinants of teacher mobility: Evidence using Italian teachers' transfer applications"

Sumário: Of particular importance for education policymakers is the possibility that teacher mobility adversely affects the quality of teaching in schools serving mainly disadvantaged and minority children. This paper examines the main drivers of the mobility of Italian teachers by using applications-to-transfer data. We find that teachers systematically try to move away from schools where teaching is likely to be more difficult because of the student mix or the social context of the school. Given the absence of any criteria other than seniority in regulating teachers' allocation across schools, disadvantaged students frequently end up with less experienced teachers who are often just waiting to move elsewhere.

Referência: (Belot and Webbink 2010)

Título: "Do Teacher Strikes Harm Educational Attainment of Students?"

Sumário: This paper investigates the effects of a teacher strike on student achievement. From May1990 until November 1990 teachers in the French community of Belgium stroked to obtain a salary increase. We exploit the political division of Belgium in a French community and a Flemish community, with similar educational institutions, for estimating the long-term effects of the strikes. Based on a difference-in-differences approach, using data from two different surveys, we find some evidence that the strikes reduced educational attainment and increased class repetition. We also find that the strikes led toa significant reallocation of students to a lower level of higher education. Overall, the results suggest that teacher strikes can lead to substantial costs for those not involved in the conflict.

Referência: (Biasi 2021)

Título: "The Labor Market for Teachers under Different Pay Schemes"

Sumário: Compensation of most US public school teachers is rigid and solely based on seniority. This paper studies the effects of a reform that gave school districts in Wisconsin full autonomy to redesign teacher pay schemes. Following the reform some districts switched to flexible compensation. Using the expiration of pre-existing collective bargaining agreements as a source of exogenous variation in the timing of changes in pay, I show that the introduction of flexible pay raised salaries of high-quality teachers, increased teacher quality (due to the arrival of high-quality teachers from other districts and increased effort), and improved student achievement.

Referência: (Bobba, et al. 2022)

Título: "Teacher Compensation and Structural Inequality: Evidence from Centralized Teacher School Choice in Perú"

Sumário: This paper studies how increasing teacher compensation at hard-to-staff schools can reduce inequality in access to qualified teachers. Leveraging an unconditional change in the structure of teacher compensation in Perú, we first show causal evidence that increasing salaries at less desirable locations attracts teachers who score 0.45 standard deviations higher in standardized competency tests, leading to an average increase in student test scores of 0.33-0.38 standard deviations. We then estimate a model of teacher preferences over local amenities, school characteristics, and wages using geocoded job postings and rich application data from the nationwide centralized teacher assignment system. A policy that sets compensation at each job posting taking into account teacher preferences is more cost-effective than the actual policy in terms of reducing structural inequality in access to learning opportunities, and it possibly enhances the efficiency of the education system.

Referência: (D. Boyd, P. Grossman, et al. 2011)

Título: "Recruiting Effective Math Teachers: Evidence From New York City"

Sumário: This article explores the relationship between school contextual factors and teacher retention decisions in New York City. The methodological approach separates the effects of teacher characteristics from school characteristics by modelling the relationship between the assessments of school contextual factors by one set of teachers and the turnover decisions by other teachers in the same school. We find that teachers' perceptions of the school administration has, by far, the greatest influence on teacher retention decisions. This effect of administration is consistent for first-year

teachers and the full sample of teachers and is confirmed by a survey of teachers who have recently left teaching.

Referência: (D. Boyd, P. Grossman, et al. 2012)

Título: "The Influence of School Administrators on Teacher Retention Decisions"

Sumário: For well over a decade school districts across the United States have struggled to recruit and retain effective mathematics teachers. In response to the need for qualified math teachers and the difficulty of directly recruiting individuals who have already completed the math content required for qualification, some districts, including Baltimore, Philadelphia, Washington, D.C., and New York City, have developed alternative certification programs with a math immersion component to recruit otherwise well-qualified candidates who do not have undergraduate majors in math. This article examines the qualifications, student achievement gains, and retention of Math Immersion teachers in New York City compared to New York City mathematics teachers who began their careers through other pathways.

Referência: (Britton and Propper 2016)

Título: "Teacher pay and school productivity: Exploiting wage regulation"

Sumário: The impact of teacher pay on school productivity is a central concern for governments worldwide, yet evidence is mixed. In this paper we exploit a feature of teacher labour markets to determine the impact of teacher wages. Teacher wages are commonly set in a manner that results in flat wages across heterogeneous labour markets. This creates an exogenous gap between the outside labour market and inside (regulated) wage for teachers. We use the centralised wage regulation of teachers in England to examine the effect of pay on school performance. We use data on over 3000 schools containing around 200,000 teachers who educate around half a million children per year. We find that teachers respond to pay. A ten percent shock to the wage gap between local labour market and teacher wages results in an average loss of around 2% in average school performance in the key exams taken at the end of compulsory schooling in England.

Referência: (Bueno and Sass 2018)

Título: "The Effects of Differential Pay on Teacher Recruitment and Retention"

Sumário: Traditionally, teacher salaries have been determined solely by experience and educational attainment. This has led to chronic shortages of teachers in particular subject areas, such as math, science and special education. We study the first long-running state-wide program to differentiate teacher pay based on subject area, Georgia's bonus system for math and science teachers. Using a difference-in-differences

strategy, we find the bonuses reduce teacher attrition by 18 to 28 percent. However, we find no evidence the program increases the probability that education majors become secondary math or science teachers upon graduation or alters specific major choices within the education field.

Referência: (Buhl-Wiggers, et al. 2017)

Título: "The Impact of Teacher Effectiveness on Student Learning in Africa"

Sumário: Teacher effectiveness is known to be critical for students' education and life prospects in several developed countries. However, little is known about how teacher effectiveness affects student learning in Africa. This paper presents the first estimates of teacher effectiveness from an African country, using data from a school based RCT in northern Uganda. Exploiting the random assignment of students to classrooms within schools, we estimate a lower bound on the variation in teacher effectiveness. A 1-SD increase in teacher effectiveness leads to at least a 0.14 SD improvement in student performance on a reading test at the end of the year. We find no detectable correlation between teacher effectiveness and teacher characteristics, but we do find that more effective teachers have more structured lessons and more active students. In addition, we find that providing teacher training and support increases the variation in teacher effectiveness, by making the most-effective teachers relatively better than the least-effective teachers.

Referência: (Burgess, Greaves and Murphy 2022)

Título: "Deregulating Teacher Labor Markets"

Sumário: This paper examines how the removal of national pay scales, a common feature of public sector labour markets, affects productivity. We exploit a reform that compelled all schools in England to replace pay scales with school-designed performance related pay schemes. Using teacher-level data, we find that in response to the reform, schools in labour markets with better outside options for teachers have relatively higher teacher pay progression, spending on teachers, teacher retention and student performance. These effects are largest for schools with a more disadvantaged demographic. We conclude that centralized pay scales result in a misallocation of resources by preventing such schools from retaining their teachers.

Referência: (Carrell and Hoekstra 2014)

Título: "Are school counsellors an effective education input?"

Sumário: We exploit within-school variation in counsellors and find that one additional counsellor reduces student misbehaviour and increases boys' academic achievement by

over one percentile point. These effects compare favourably with those of increased teacher quality and smaller class sizes.

Referência (Correa, Parro and Reyes 2015)

Título: "Self-selection in the market of teachers"

Sumário: Public school teachers are usually paid according to centralized earning schedules, in which their income depends mainly on experience. By contrast, in private schools, there is high wage dispersion, and salaries correspond mainly to teachers' performance. That dichotomous labour regulation encourages teachers with better unobservable skills to self-select into private schools because the likelihood of earning higher wages is higher than in public schools. The other side of the coin is the self-selection of 'bad' teachers into public schools. Using a representative sample of Chilean teachers, we estimate a two-sector Roy model to test self-selection. We find evidence of negative self-selection of teachers into public schools.

Referência: (Cortes, Goodman and Nomi 2015)

Título: "Intensive Math Instruction and Educational Attainment Educational Attainment: Long-Run Impacts of Double-Dose Algebra"

Sumário: We study an intensive math instruction policy that assigned low-skilled ninth graders to an algebra course that doubled instructional time, altered peer composition, and emphasized problem solving skills. A regression discontinuity design shows substantial positive impacts of double-dose algebra on credits earned, test scores, high school graduation, and college enrolment rates. Test score effects underpredict attainment effects, highlighting the importance of long-run evaluation of such a policy. Perhaps because the intervention focused on verbal exposition of mathematical concepts, the impact was largest for students with below-average reading skills, emphasizing the need to target interventions toward appropriately skilled students.

Referência: (Cotofan 2021)

Título: "Learning from praise: Evidence from a field experiment with teachers"

Sumário: Financial incentive programs for teachers are increasingly common, but little is known about the effectiveness of non-monetary incentives in improving educational outcomes. This field experiment measures how repeated public praise for the best teachers impacts student performance. In treated schools, the students of praised teachers perform better on standardized exams undertaken six months after the intervention. Praised teachers also assign higher marks to their students two months after the intervention. The students of teachers who are not praised in treated schools are assigned lower marks two months after the intervention, but they do not perform

any worse on final exams. Compared to costly interventions where teachers receive financial incentives, the effects of public praise for praised teachers are remarkably large.

Referência: (de Ree, et al. 2018)

Título: "Double for Nothing? Experimental Evidence on an Unconditional Teacher Salary Increase in Indonesia"

Sumário: How does a large unconditional increase in salary affect the performance of incumbent employees in the public sector? We present experimental evidence on this question in the context of a policy change in Indonesia that led to a permanent doubling of teacher base salaries. Using a large-scale randomized experiment across a representative sample of Indonesian schools that accelerated this pay increase for teachers in treated schools, we find that the large pay increase significantly improved teachers' satisfaction with their income, reduced the incidence of teachers holding outside jobs, and reduced self-reported financial stress. Nevertheless, after two and three years, the increase in pay led to no improvement in student learning outcomes. The effects are precisely estimated, and we can rule out even modest positive impacts on test scores. Our results suggest that unconditional pay increases are unlikely to be an effective policy option for improving the effort and productivity of incumbent employees in public-sector settings.

Referência: (Feng and Sass 2018)

Título: "The Impact of Incentives to Recruit and Retain Teachers in "Hard-to-Staff" Subjects"

Sumário: We investigate the effects of a state-wide program designed to increase the supply of teachers in designated "hard-to-staff" areas, such as special education, math, and science. Employing a difference-in-difference estimator we find that the loan forgiveness component of the program was effective, reducing mean attrition rates for middle and high school math and science teachers by 10.4 percent and 8.9 percent, respectively. We also find that the impact of loan forgiveness varied with the generosity of payments; when fully funded, the program reduced attrition of special education teachers by 12.3 percent but did not have a statistically significant impact when funding was substantially reduced. A triple-difference estimate indicates that a one-time bonus program also had large effects, reducing the likelihood of teachers' exit by as much as 32 percent in the short run. A back-of-the-envelope cost-benefit analysis suggests that both the loan forgiveness and the bonus program were cost effective.

Referência: (Fredriksson, Öckert and Oosterbeek 2013)

Título: "Long-Term Effects of Class Size"

Sumário: This article evaluates the long-term effects of class size in primary school. We use rich data from Sweden and exploit variation in class size created by a maximum class size rule. Smaller classes in the last three years of primary school (age 10 to 13) are beneficial for cognitive and noncognitive ability at age 13 and improve achievement at age 16. Most important, we find that smaller classes have positive effects on completed education, wages, and earnings at age 27 to 42. The estimated wage effect is large enough to pass a cost-benefit test.

Referência: (Fryer 2013)

Título: "Teacher Incentives and Student Achievement: Evidence from New York City Public Schools"

Sumário: As global policy makers and school leaders look for ways to improve student performance, financial incentives programs for teachers have become increasingly popular. This article describes a school-based randomized trial in over 200 New York City public schools designed to better understand the impact of teacher incentives. I find no evidence that teacher incentives increase student performance, attendance, or graduation, nor do I find evidence that these incentives change student or teacher behaviour. If anything, teacher incentives may decrease student achievement, especially in larger schools. The article concludes with a speculative discussion of theories to explain these stark results.

Referência: (Gibbons, Scrutinio and Telhaj 2021)

Título: "Teacher turnover: Effects, mechanisms and organisational responses"

Sumário: This paper contributes to the understanding of the causal relationship between teacher turnover and student performance. We extend this research by examining the mechanisms through which turnover affects student learning, and by providing evidence on how schools respond to mitigate the disruptive effects of turnover. Using administrative data covering all state-school, age-16 students and their teachers in England, we find that a higher teacher entry rate has a small but significant negative effect on students' final qualifications from compulsory-age schooling. This is the first study to document that the lack of school-specific human capital in incoming teachers is the main mechanism through which turnover disrupts student performance. We also find evidence that schools mitigate the effects of turnover by assigning new teachers away from high-risk student grades.

Referência: (Goldhaber, Krieg and Theobald 2020)

Título: "Effective like me? Does having a more productive mentor improve the productivity of mentees?"

Sumário: We use a novel database of the preservice apprenticeships ("student teaching placements") of teachers in Washington State to investigate the relationship between mentor effectiveness (as measured by value added) and the future effectiveness of their mentees. We find a strong, positive relationship between the effectiveness of a teacher's mentor and their own effectiveness in math and a more modest relationship in English Language Arts. The relationship in math is strongest early in a teacher's career and would be positive and statistically significant even in the presence of non-random sorting on unobservables of the same magnitude as the sorting on observables. This suggests that at least some of this relationship reflects a causal relationship between mentor effectiveness and the future effectiveness of their mentees in math.

Referência: (Goodman 2014)

Título: "Flaking Out: Student Absences and Snow Days as Disruptions of Instructional Time"

Sumário: Despite the fact that the average American student is absent more than two weeks out of every school year, most research on the effect of instructional time has focused not on attendance but on the length of the school day or year. Student and school fixed effects models using Massachusetts data show a strong relationship between student absences and achievement but no impact of lost instructional time due to school closures. I confirm those findings in instrumental variables models exploiting the fact that moderate snowfall induces student absences while extreme snowfall induces school closures. Prior work ignoring this non-linearity may have mis-attributed the effect of absences to such snow days. Each absence induced by bad weather reduces math achievement by 0.05 standard deviations, suggesting that attendance can account for up to one-fourth of the achievement gap by income. That absences matter but closures do not is consistent with a model of instruction in which coordination of students is the central challenge, as in Lazear (2001). Teachers appear to deal well with coordinated disruptions of instructional time like snow days but deal poorly with disruptions like absences that affect different students at different times.

Referência: (Guryan, et al. 2021)

Título: "Not Too Late: Improving Academic Outcomes Among Adolescents"

Sumário: There is growing concern that it is too difficult or costly to substantially improve the academic skills of children who are behind in school once they reach adolescence. But perhaps what we have tried in the past relies on the wrong interventions, failing to account for challenges like the increased variability in academic

needs during adolescence, or heightened difficulty of classroom management. This study tests the effects of one intervention that tries to solve both problems by simplifying the teaching task: individualized, intensive, in-school tutoring. A key innovation by the non-profit we study (Saga Education) is to identify how to deliver "high-impact tutoring" at relatively low cost ($3,500 to $4,300 per participant per year). Our first randomized controlled trial (RCT) of Saga's tutoring model with 2,633 9th and 10th grade students in Chicago public schools found participation increased math test scores by 0.16 standard deviations (SDs) and increased grades in math and non-math courses. We replicated these results in a separate RCT with 2,710 students and found even larger math test score impacts—0.37 SD—and similar grade impacts. These effects persist into future years, although estimates for high school graduation are imprecise. The treatment effects do not appear to be the result of a generic "mentoring effect" or of changes in social-emotional skills, but instead seem to be caused by changes in the instructional "technology" that students received. The estimated benefit-cost ratio is comparable to many successful model early-childhood programs.

Referência: (Hanushek, Rivkin and Schiman 2016)

Título: "Dynamic effects of teacher turnover on the quality of instruction"

Sumário: It is widely believed that teacher turnover adversely affects the quality of instruction in urban schools serving predominantly disadvantaged children, and a growing body of research investigates various components of turnover effects. The evidence at first seems contradictory, as the quality of instruction appears to decline following turnover despite the fact that most work shows higher attrition for less effective teachers. This raises concerns that confounding factors bias estimates of transition differences in teacher effectiveness, the adverse effects of turnover or both. After taking more extensive steps to account for non-random sorting of students into classrooms and endogenous teacher exits and grade-switching, we replicate existing findings of adverse selection out of schools and negative effects of turnover in lower-achievement schools. But we find that these turnover effects can be fully accounted for by the resulting loss in experience and productivity loss following the reallocation of some incumbent teachers to different grades.

Referência: (Hanushek, Link and Woessmann 2013)

Título: "Does school autonomy make sense everywhere? Panel estimates from PISA"

Sumário: Decentralization of decision-making is among the most intriguing recent school reforms, in part because countries went in opposite directions over the past decade and because prior evidence is inconclusive. We suggest that autonomy may be conducive to student achievement in well-developed systems but detrimental in low-

performing systems. We construct a panel dataset from the four waves of international PISA tests spanning 2000–2009, comprising over one million students in 42 countries. Relying on panel estimation with country fixed effects, we estimate the effect of school autonomy from within-country changes in the average share of schools with autonomy over key elements of school operations. Our results suggest that autonomy affects student achievement negatively in developing and low-performing countries, but positively in developed and high-performing countries. These estimates are unaffected by a wide variety of robustness and specification tests, providing confidence in the need for nuanced application of reform ideas.

Referência: (Hemelt, Ladd and Clifton 2021)

Título: "Do Teacher Assistants Improve Student Outcomes? Evidence From School Funding Cutbacks in North Carolina"

Sumário: This article examines the influence of teacher assistants and other personnel on outcomes for elementary school students during a period of recession-induced cutbacks in teacher assistants. Using panel data from North Carolina, we exploit the state's unique system of financing its local public schools to identify the causal effects of teacher assistants, controlling for other staff, on measures of student achievement. We find consistent evidence of positive effects of teacher assistants, an understudied staffing category, on student performance in reading and math. We also find larger positive effects of teacher assistants on achievement outcomes for students of colour and students in high-poverty schools than for White students and students in more affluent schools. We conclude that teacher assistants are a cost-effective means of raising student achievement, especially in reading.

Referência: (Hendricks 2014)

Título: "Does it pay to pay teachers more? Evidence from Texas"

Sumário: This study presents robust evidence on the relationship between teacher pay and turnover using detailed panel data from Texas. While controlling for changes in district and local labor market characteristics, I estimate an overall turnover elasticity of − 1.4 and show that the effect is largest for inexperienced teachers, declines with experience, and disappears around 19 years of experience. Combining these results with what we know about the relationship between teacher value-added and experience, I show that paying teachers more improves student achievement through higher retention rates. The results also suggest that adopting a flat salary schedule may be a cheap way to improve student performance. I find no evidence that pay effects vary by the teacher's gender or subject taught.

Referência: (Hoxby 2000)

Título: "The Effects of Class Size on Student Achievement: New Evidence from Population Variation"

Sumário: I identify the effects of class size on student achievement using longitudinal variation in the population associated with each grade in 649 elementary schools. I use variation in class size driven by idiosyncratic variation in the population. I also use discrete jumps in class size that occur when a small change in enrolment triggers a maximum or minimum class size rule. The estimates indicate that class size does not have a statistically significant effect on student achievement. I rule out even modest effects (2 to 4 percent of a standard deviation in scores for a 10 percent reduction in class size).

Referência: (Jaume and Willén 2019)

Título: "The Long-Run Effects of Teacher Strikes: Evidence from Argentina"

Sumário: We exploit cross-cohort variation in the prevalence of teacher strikes within and across provinces in Argentina to examine how teacher strikes affect student long-run outcomes. Being exposed to the average incidence of strikes during primary school reduces labour earnings of males and females by 3.2% and 1.9%, respectively. A back-of-the-envelope calculation suggests that this amounts to an aggregate annual earnings loss of $2.34 billion. We also find an increase in unemployment and a decline in the skill levels of the occupations into which students sort. These effects are driven, at least in part, by a reduction in educational attainment.

Referência: (Jepsen and Rivkin 2009)

Título: "Class Size Reduction and Student Achievement: The Potential Trade-off between Teacher Quality and Class Size"

Sumário: This paper investigates the effects of California's billion-dollar class-size-reduction program on student achievement. It uses year-to-year differences in class size generated by variation in enrolment and the state's class-size-reduction program to identify both the direct effects of smaller classes and related changes in teacher quality. Although the results show that smaller classes raised mathematics and reading achievement, they also show that the increase in the share of teachers with neither prior experience nor full certification dampened the benefits of smaller classes, particularly in schools with high shares of economically disadvantaged, minority students.

Referência: (Johnston 2020)

Título: "Preferences, Selection, and the Structure of Teacher Pay"

Sumário: Human-capital formation in school depends largely on the selection and retention of teachers. I use a discrete-choice experiment to examine teacher preferences for compensation structure and working conditions, and I link responses to administrative records on teachers and student achievement. I calculate willingness-to-pay for a rich set of work attributes. High-performing teachers have similar preferences to other teachers, but they have stronger preferences for performance pay. Taking the preference estimates at face value in a model of teacher behavior, I explore how schools would structure compensation to meet various objectives. Under each objective, schools appear to underpay in salary and performance pay while overpaying in retirement. Restructuring compensation can increase both teacher welfare and student achievement.

Referência: (Krueger 1999)

Título: "Experimental Estimates of Education Production Functions"

Sumário: This paper analyses data on 11,600 students and their teachers who were randomly assigned to different size classes from kindergarten through third grade. Statistical methods are used to adjust for non-random attrition and transitions between classes. The main conclusions are (1) on average, performance on standardized tests increases by four percentile points the first year students attend small classes; (2) the test score advantage of students in small classes expands by about one percentile point per year in subsequent years; (3) teacher aides and measured teacher characteristics have little effect; (4) class size has a larger effect for minority students and those on free lunch; (5) Hawthorne effects were unlikely.

Referência: (Krueger and Whitmore 2001)

Título: "The Effect of Attending a Small Class in the Early Grades on College-Test Taking and Middle School Test Results: Evidence from Project STAR"

Sumário: This paper provides a long-term follow-up analysis of students who participated in the Tennessee STAR experiment. In this experiment, students and their teachers were randomly assigned to small, regular-size, or regular-size classes with a teacher aide in the first four years of school. We analyse the effect of past attendance in small classes on student test scores and whether they took the ACT or SAT college entrance exam. Attending a small class in the early grades is associated with an increased likelihood of taking a college-entrance exam, especially among minority students, and somewhat higher test scores.

Referência: (Lavy 2015)

Título: "Do Differences in Schools' Instruction Time Explain International Achievement Gaps? Evidence from Developed and Developing Countries"

Sumário: The time that children spend in school varies across countries. Do these differences explain international gaps in pupils' academic achievements? In this article I estimate the effects of instructional time on students' achievement using PISA 2006 data, which include data samples from over 50 countries. I find that instructional time has a positive and significant effect on test scores, and that the effect is much lower in developing countries. Evidence also suggests that the productivity of instructional time is higher in countries which implemented school accountability measures or that gave schools autonomy in budgetary decisions and in hiring/firing teachers.

Referência: (Maldonado and De Witte 2022)

Título: "The effect of school closures on standardised student test outcomes"

Sumário: The school closures owing to the 2020 COVID-19 crisis resulted in a significant disruption of education provision, leading to fears of learning losses and of an increase in educational inequality. This article evaluates the effects of school closures based on standardised tests in the last year of primary school in the Dutch-speaking Flemish region of Belgium. Using a 6-year panel, we find that students of the 2020 cohort experienced significant learning losses in three out of five tested subjects, with a decrease in school averages of mathematics scores of 0.17 standard deviations and Dutch scores (reading, writing, language) of 0.19 standard deviations as compared to previous cohorts. This finding holds when accounting for school characteristics, standardised tests in Grade 4 and school fixed effects. Given the large observed effect sizes, the effect of school closures appears to be a combination of lost learning progress and learning loss. Moreover, we observe that inequality both within schools and across schools rises by 7% for mathematics and 8% for Dutch. The learning losses are correlated with observed school characteristics, as schools with a more disadvantaged student population experience larger learning losses.

Referência: (Monroy-Gómez-Franco, Vélez-Grajales and López-Calva 2022)

Título: "The potential effects of the COVID-19 pandemic on learnings"

Sumário: In this paper, we use a new database for Mexico to model the possible long-run effects of the pandemic on learning. First, based on the framework of Neidhöffer et al. (2021), we estimate the loss of schooling due to the transition from in-person to remote learning using data from the National Survey on Social Mobility (ESRU-EMOVI-2017), census data, and national statistics of COVID-19 incidence. In this estimation, we account for the attenuation capacity of households by considering the parental educational attainment and the economic resources available to the household in the

calculation of the short-run cost. Secondly, we estimate the potential long-run consequences of this shock through a calibrated learning profile for five Mexican regions following Kaffenberger and Pritchett (2020a, 2020b). Assuming the distance learning policy adopted by the Mexican government is entirely effective, our results indicate that a learning loss equivalent to the learning during a third of a school year in the short run translates into a learning loss equivalent to an entire school year further up the educational career of students. On the other hand, if the policy was ineffective, the short-run loss increases to an entire school year and becomes a loss of two years of learning in the long run. Our results suggest substantial variation at the regional level, with the most affected region, the South experiencing a loss thrice as large as that of the least affected region, the Centre region.

Referência: (Mulhern 2020)

Título: "Beyond Teachers: Estimating Individual Guidance Counsellors' Effects on Educational Attainment"

Sumário: Counsellors are a common school resource for students navigating complicated and consequential education choices. I estimate counsellors' causal effects using quasi-random assignment policies in Massachusetts. Counsellors vary substantially in their effectiveness at increasing high school graduation and college attendance, selectivity, and persistence. Counselor effects on educational attainment are similar in magnitude to teacher effects, but they flow through improved information and assistance, rather than through cognitive or noncognitive skill development. Counsellor effectiveness is most important for low-income and low-achieving students. Improving access to effective counselling may be a promising way to increase educational attainment and close socioeconomic gaps in education.

Referência: (Nickow, Oreopoulos and Quan 2020)

Título: "The Impressive Effects of Tutoring on PreK-12 Learning: A Systematic Review and Meta-Analysis of the Experimental Evidence"

Sumário: Tutoring—defined here as one-on-one or small-group instructional programming by teachers, paraprofessionals, volunteers, or parents—is one of the most versatile and potentially transformative educational tools in use today. Within the past decade, dozens of preK-12 tutoring experiments have been conducted, varying widely in their approach, context, and cost. Our study represents the first systematic review and meta-analysis of these and earlier studies. We develop a framework for considering different types of programs to not only examine overall effects, but also explore how these effects vary by program characteristics and intervention context. We find that tutoring programs yield consistent and substantial positive impacts on learning

outcomes, with an overall pooled effect size estimate of 0.37 SD. Effects are stronger, on average, for teacher and paraprofessional tutoring programs than for nonprofessional and parent tutoring. Effects also tend to be strongest among the earlier grades. While overall effects for reading and math interventions are similar, reading tutoring tends to yield higher effect sizes in earlier grades, while math tutoring tends to yield higher effect sizes in later grades. Tutoring programs conducted during school tend to have larger impacts than those conducted after school.

Referência: (Papay, et al. 2020)

Título: "Learning Job Skills from Colleagues at Work: Evidence from a Field Experiment Using Teacher Performance Data"

Sumário: We study a program designed to encourage learning from co-workers among schoolteachers. In an experiment, we document gains in job performance when high- and low-skilled teachers are paired and asked to work together on improving their skills. Pairs are matched on specific skills measured in prior evaluations. Each pair includes a target teacher who scores low in one or more of 19 skills and a partner who scores high in (many of) the target's deficient skills. Student achievement improved 0.12 standard deviations in low-skilled teachers' classrooms. Improvements are likely the result of target teachers learning skills from their partner.

Referência: (Patrinos, Vegas and Carter-Rau 2022)

Título: "An Analysis of COVID-19 Student Learning Loss"

Sumário: COVID-19 caused significant disruption to the global education system. Early reviews of the first wave of lockdowns and school closures suggested significant learning loss in a few countries. A more recent and thorough analysis of recorded learning loss evidence documented since the beginning of the school closures between March 2020 and March 2022 finds even more evidence of learning loss. Most studies observed increases in inequality where certain demographics of students experienced more significant learning losses than others. But there are also outliers, countries that managed to limit the amount of loss. This review aims to consolidate all the available evidence and documents the empirical findings. Thirty-six robust studies were identified, the majority of which find learning losses on average amounting to 0.17 of a standard deviation, equivalent to roughly a one-half years' worth of learning. These findings confirm that learning loss is real and significant, even compared to the first year of the pandemic. Further work is needed to increase the quantity of studies produced, and to ascertain the reasons for learning loss and in a few cases mitigation of loss.

Referência: (Penner 2016)

Título: "Teaching for All? Teach For America's Effects Across the Distribution of Student Achievement"

Sumário: This article examines the effect of Teach For America (TFA) on the distribution of student achievement in elementary school. It extends previous research by estimating quantile treatment effects (QTE) to examine how student achievement in TFA and non-TFA classrooms differs across the broader distribution of student achievement. It also updates prior distributional work on TFA by correcting for previously unidentified missing data and estimating unconditional rather than conditional QTE. Consistent with previous findings, results reveal a positive impact of TFA teachers across the distribution of math achievement. In reading, however, relative to veteran non-TFA teachers, students at the bottom of the reading distribution score worse in TFA classrooms, and students in the upper half of the distribution perform better.

Referência: (Rivkin and Schiman 2015)

Título: "Instruction time, Classroom Quality, and Academic Achievement"

Sumário: It seems likely the magnitude of any causal link between achievement and instruction time depends upon the quality of instruction, the classroom environment and the rate that students translate classroom time into added knowledge. In this article, we use panel data methods to investigate instruction time effects in the 2009 Programme for International Student Assessment data. The empirical analysis shows that achievement increases with instruction time and that the increase varies by both the amount of time and the classroom environment. The results indicate that school circumstances are important determinants of the benefits and desirability of increased instruction time.

Referência: (Rockoff 2008)

Título: "Does Mentoring Reduce Turnover and Improve Skills of New Employees? Evidence from Teachers in New York City"

Sumário: Mentoring has become an extremely popular policy for improving the retention and performance of new teachers, but we know little about its effects on teacher and student outcomes. I study the impact of mentoring in New York City, which adopted a nationally recognized mentoring program in 2004. I use detailed program data to examine the relationship between teacher and student outcomes and measures of mentoring quality, such as hours of mentoring received and the characteristics of mentors. Although assignment of teachers to mentors was non-random, I use instrumental variables and school fixed effects to address potential sources of bias. I find strong relationships between measures of mentoring quality and teachers' claims regarding the impact of mentors on their success in the classroom, but weaker evidence

of effects on teacher absences, retention, and student achievement. The most consistent finding is that retention within a particular school is higher when a mentor has previous experience working in that school, suggesting that an important part of mentoring may be the provision of school specific knowledge. I also find evidence that student achievement in both reading and math were higher among teachers that received more hours of mentoring, supporting the notion that time spent working with a mentor does improve teaching skills.

Referência: (See, et al. 2020)

Título: "Teacher Recruitment and Retention: A Critical Review of International Evidence of Most Promising Interventions"

Sumário: Background: A raft of initiatives and reforms have been introduced in many countries to attract and recruit schoolteachers, many of which do not have a clear evidence base, so their effectiveness remains unclear. Prior research has been largely correlational in design. This paper describes a rigorous and comprehensive review of international evidence, synthesising the findings of some of the strongest empirical work so far. Methods: The review synthesises a total of 120 pieces of research from 13 electronic databases, Google/Google scholar and other sources. Each study is weighted by strength of evidence. Results: The strongest evidence suggests that targeted money can encourage people into teaching but does not necessarily keep them in the teaching profession. The money needs to be large enough to compensate for the disadvantages of working in certain schools and areas, and competitive enough to offset the opportunity costs of not being in more lucrative occupations, and its effect is only short-term. Conclusions: Continuing professional development (CPD) and early career support could be promising approaches for retaining teachers in the profession, but the evidence for them is weak. There is no evidence that any other approaches work, largely because of the lack of robust studies.

Referência: (Sims and Benhenda 2022)

Título: "The effect of financial incentives on the retention of shortage-subject"

Sumário: School systems often experience shortages of maths and science teachers, reflecting difficulties in both recruiting and retaining people qualified to teach these subjects. In England, teachers with maths and science degrees face a higher outside pay ratio than other teachers and also tend to leave the profession at higher rates. We evaluate a policy aimed at improving retention by providing targeted uplifts in pay worth 8% of gross salary for early-career maths and physics teachers. Leveraging variation in eligibility across time, regions and school subjects, we find that eligible teachers are 23% less likely to leave teaching in state funded schools in years they were eligible for

payments. This implies a pay-elasticity-of-exit of -3, which is similar to results from evaluations of similar policies in the United States. Our analysis suggests that the cost per additional teacher retained through the policy is 32% lower than training an equivalent replacement teacher. Taken together, these results suggest that persistent shortages of maths and science teachers can be reduced through targeted pay supplement policies

Referência: (Springer, et al. 2010)

Título: "Teacher Pay for Performance: Experimental Evidence from the Project on Incentives in Teaching"

Sumário: The Project on Incentives in Teaching (POINT) was a three-year study conducted in the Metro Nashville Public Schools from 2006-07 through 2008-09. Middle school mathematics teachers voluntarily participated in a controlled experiment to assess the effect of offering financial rewards to teachers whose students showed unusual gains on standardized tests. This report contains a description of the project and a summary of the principal effects of the incentives on student achievement. A longer, more comprehensive report will appear within the next few months. The longer report will contain an exhaustive description of data collection and a more elaborate analysis of teachers' responses to surveys that asked about their attitudes toward incentive pay, their perceptions of school climate, and changes in their behaviour over the course of the experiment. We have made the decision to go forward with a shorter, more focused report at this time given the intense interest in this topic in education policy circles. While this document is shorter than the full report to come, this should not be taken to mean that it is unduly simplified. The issues involved in analysing the impact of incentives in POINT are complex, and much of the discussion is necessarily technical.

Referência: (Whitford, Zhang e Katsiyannis 2018)

Título: "Traditional vs. Alternative Teacher Preparation Programs: A Meta-Analysis"

Sumário: A meta-analysis is presented of the academic achievement effects on students taught by teachers from alternative teacher preparation (ATP) programs, compared to students taught by teachers from traditional teacher preparation (TTP) programs. The literature has indicated mixed results on the student-level academic outcomes of ATP programs. Findings from this meta-analysis indicate an overall statistically significant, yet small, difference in ATP and TTP programs (g = 0.03; 95% CI = 0.01, 0.04, p = 0.001), with the mean achievement of students who had ATP teachers was about 0.03 standard deviations above that of students who had TTP teachers. Further, there were differences

in student achievement by type of ATP program, school level, and academic subject area. These results, as well as implications for policy and practice are discussed.

Referência: (Xu, Hannaway and Taylor 2011)

Título: "Making a Difference? The Effects of Teach For America in High School"

Sumário: Teach For America (TFA) selects and places graduates from the most competitive colleges as teachers in the lowest-performing schools in the country. This paper is the first study that examines TFA effects in high school. We use rich longitudinal data from North Carolina and estimate TFA effects through cross-subject student and school fixed effects models. We find that TFA teachers tend to have a positive effect on high school student test scores relative to non-TFA teachers, including those who are certified in field. Such effects offset or exceed the impact of additional years of experience and are particularly strong in science.

Referências:

Abrahamsen, Signe, Rita Ginja, and Julie Riise. 2021. "School Health Programs: Education, Health, and Welfare Dependency of Young Adults." *IZA Discussion Paper.* https://dx.doi.org/10.2139/ssrn.3892574.

Angrist, Joshua D., and Victor Lavy. 1999. "Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement." *The Quarterly Journal of Economics*, May: 533–575. https://doi.org/10.1162/003355399556061.

Angrist, Joshua D., Erich Battistin, and Daniela Vuri. 2017. "In a Small Moment: Class Size and Moral Hazard in the Italian Mezzogiorno." *American Economic Journal: Applied Economics*, October: 216–249. https://doi.org/10.1257/app.20160267.

Angrist, Joshua D., Victor Lavy, Jetson Leder-Luis, and Adi Shany. 2019. "Maimonides' Rule Redux." *American Economic Review: Insights*, December: 309–324. https://doi.org/10.1257/aeri.20180120.

Antecol, Heather, Ozkan Eren, and Serkan Ozbeklik. 2013. "The effect of Teach for America on the distribution of student achievement in primary school: Evidence from a randomized experiment." *Economics of Education Review* 37: 113-125. https://doi.org/10.1016/j.econedurev.2013.08.004.

Atteberry, Allison, Susanna Loeb, and James Wyckoff. 2017. "Teacher Churning: Reassignment Rates and Implications for Student Achievement." *Educational Evaluation and Policy Analysis* 39 (1): 3–30. https://doi.org/10.3102/0162373716659929.

Barbieri, Gianna, Claudio Rossetti, and Paolo Sestito. 2011. "The determinants of teacher mobility: Evidence using Italian teachers' transfer applications." *Economics of Education Review* 30 (6): 1430-1444. https://doi.org/10.1016/j.econedurev.2011.07.010.

Belot, Michèle, and Dinand Webbink. 2010. "Do Teacher Strikes Harm Educational Attainment of Students?" *LABOUR* 24 (4): 391-406. https://doi.org/10.1111/j.1467-9914.2010.00494.x.

Biasi, Barbara. 2021. "The Labor Market for Teachers under Different Pay Schemes." *American Economic Journal: Economic Policy* 13: 63-102. https://www.aeaweb.org/articles?id=10.1257/pol.20200295.

Bobba, Matteo, Tim Ederer, Gianmarco León-Ciliotta, Christopher A. Neilson, and Marco Nieddu. 2022. "Teacher Compensation and Structural Inequality: Evidence from

Centralized Teacher School Choice in Perú." February. http://www.nber.org/papers/w29068.

Boyd, Donald, Pam Grossman, Marsha Ing, Hamilton Lankford, Susanna Loeb, and James Wyckoff. 2011. "The Influence of School Administrators on Teacher Retention Decisions." *American Educational Research Journal* 48 (2): 303–333. https://doi.org/10.3102/0002831210380788.

Boyd, Donald, Pamela Grossman, Karen Hammerness, Hamilton Lankford, Susanna Loeb, Matthew Ronfeldt, and James Wyckoff. 2012. "Recruiting Effective Math Teachers: Evidence From New York City." *American Educational Research Journal*, December: 1008-1047. https://www.jstor.org/stable/23319637.

Britton, Jack, and Carol Propper. 2016. "Teacher pay and school productivity: Exploiting wage regulation." *Journal of Public Economics* 133: 75-89. https://doi.org/10.1016/j.jpubeco.2015.12.004.

Bueno, Carycruz, and Tim R. Sass. 2018. "The Effects of Differential Pay on Teacher Recruitment and Retention." *Andrew Young School of Policy Studies Research Paper Series.* https://dx.doi.org/10.2139/ssrn.3296427.

Buhl-Wiggers, Julie, Jason T. Kerwin, Jeffrey A. Smith, and Rebecca Thornton. 2017. "The Impact of Teacher Effectiveness on Student Learning in Africa." *Centre for the Study of African Economies Conference.* https://iussp.confex.com/iussp/ipc2017/mediafile/Presentation/Paper4420/The%20Impact%20of%20Teacher%20Effectiveness%202017-30-09.pdf.

Burgess, Simon, Ellen Greaves, and Richard Murphy. 2022. "Deregulating Teacher Labor Markets." *Economics of Education Review*, June: 102253. https://doi.org/10.1016/j.econedurev.2022.102253.

Carrell, Scott E., and Mark Hoekstra. 2014. "Are school counselors an effective education input?" *Economics Letters* 125: 66-69. https://doi.org/10.1016/j.econlet.2014.07.020.

Correa, Juan A., Francisco Parro, and Loreto Reyes. 2015. "Self-selection in the market of teachers." *Applied Economics* 47 (13): 1331-1349. https://doi.org/10.1080/00036846.2014.995365.

Cortes, Kalena E., Joshua S. Goodman, and Takako Nomi. 2015. "Intensive Math Instruction and Educational Attainment Educational Attainment: Long-Run Impacts of Double-Dose Algebra." *The Journal of Human Resources* 50: 108-158. https://doi.org/10.3368/jhr.50.1.108.

Cotofan, Maria. 2021. "Learning from praise: Evidence from a field experiment with teachers." *Journal of Public Economics*, December: 104540. https://doi.org/10.1016/j.jpubeco.2021.104540.

de Ree, Joppe, Karthik Muralidharan, Menno Pradhan, and Halsey Rogers. 2018. "Double for Nothing? Experimental Evidence on an Unconditional Teacher Salary Increase in Indonesia." *The Quarterly Journal of Economics* 133 (2): 993–1039. https://doi.org/10.1093/qje/qjx040.

Feng, Li, and Tim R. Sass. 2018. "The Impact of Incentives to Recruit and Retain Teachers in "Hard-to-Staff" Subjects." *Journal of Policy Analysis and Management*, October: 112-135. https://doi.org/10.1002/pam.22037.

Fredriksson, Peter, Björn Öckert, and Hessel Oosterbeek. 2013. "Long-Term Effects of Class Size." *The Quarterly Journal of Economics*, February: 249–285. https://doi.org/10.1093/qje/qjs048.

Fryer, Roland G. 2013. "Teacher Incentives and Student Achievement: Evidence from New York City Public Schools." *Journal of Labor Economics* 31: 373-407. https://doi.org/10.1086/667757.

Gibbons, Stephen, Vincenzo Scrutinio, and Shqiponja Telhaj. 2021. "Teacher turnover: Effects, mechanisms and organisational responses." *Labour Economics*, December: 102079. https://doi.org/10.1016/j.labeco.2021.102079.

Goldhaber, Dan, John Krieg, and Roddy Theobald. 2020. "Effective like me? Does having a more productive mentor improve the productivity of mentees?" *Labour Economics*, April: 101792. https://doi.org/10.1016/j.labeco.2019.101792.

Goodman, Joshua. 2014. "Flaking Out: Student Absences and Snow Days as Disruptions of Instructional Time." *NBER Working Paper.* http://www.nber.org/papers/w20221.

Guryan, Jonathan, Jens Ludwig, Monica P. Bhatt, Philip J. Cook, Jonathan M.V. Davis, Kenneth Dodge, George Farkas, et al. 2021. "Not Too Late: Improving Academic Outcomes Among Adolescents." *NBER Working Paper.* https://www.nber.org/papers/w28531.

Hanushek, Eric A., Steven G. Rivkin, and Jeffrey C. Schiman. 2016. "Dynamic effects of teacher turnover on the quality of instruction." *Economics of Education Review*, December: 132–148. https://doi.org/10.1016/j.econedurev.2016.08.004.

Hanushek, Eric A., Susanne Link, and Ludger Woessmann. 2013. "Does school autonomy make sense everywhere? Panel estimates from PISA." *Journal of Development Economics* 104: 212-232. https://doi.org/10.1016/j.jdeveco.2012.08.002.

Hemelt, Steven W., Helen F. Ladd, and Calen R. Clifton. 2021. "Do Teacher Assistants Improve Student Outcomes? Evidence From School Funding Cutbacks in North Carolina." *Educational Evaluation and Policy Analysis* 43 (2): 280-304. https://doi.org/10.3102/0162373721990361.

Hendricks, Matthew D. 2014. "Does it pay to pay teachers more? Evidence from Texas." *Journal of Public Economics*, January: 50–63. https://doi.org/10.1016/j.jpubeco.2013.11.001.

Hoxby, Caroline M. 2000. "The Effects of Class Size on Student Achievement: New Evidence from Population Variation." *The Quarterly Journal of Economics*, November: 1239–1285. https://doi.org/10.1162/003355300555060.

Jaume, David, and Alexander Willén. 2019. "The Long-Run Effects of Teacher Strikes: Evidence from Argentina." *Journal of Labor Economics* 37: 1097-1139. https://doi.org/10.1086/703134.

Jepsen, Christopher, and Steven Rivkin. 2009. "Class Size Reduction and Student Achievement: The Potential Tradeoff between Teacher Quality and Class Size." *The Journal of Human Resources* 44: 223-250. http://jhr.uwpress.org/content/44/1/223.short.

Johnston, Andrew C. 2020. "Preferences, Selection, and the Structure of Teacher Pay." https://dx.doi.org/10.2139/ssrn.3532779.

Krueger, Alan B. 1999. "Experimental Estimates of Education Production Functions." *The Quarterly Journal of Economics* 114: 497-532. https://www.jstor.org/stable/2587015.

Krueger, Alan B., and Diane M. Whitmore. 2001. "The Effect of Attending a Small Class in the Early Grades on College-Test Taking and Middle School Test Results: Evidence from Project STAR." *The Economic Journal* 111: 1-28. https://www.jstor.org/stable/2667840.

Lavy, Victor. 2015. "Do Differences in Schools' Instruction Time Explain International Achievement Gaps? Evidence from Developed and Developing Countries." *The Economic Journal* 125 (588): F397–F424. https://doi.org/10.1111/ecoj.12233.

Maldonado, Joana Elisa, and Kristof De Witte. 2022. "The effect of school closures on standardised student test outcomes." *British Educational Research Journal* 48 (1): 49-94. https://doi.org/10.1002/berj.3754.

Monroy-Gómez-Franco, Luis, Roberto Vélez-Grajales, and Luis F. López-Calva. 2022. "The potential effects of the COVID-19 pandemic on learnings." *International Journal of Educational Development* 91: 102581. https://doi.org/10.1016/j.ijedudev.2022.102581.

Mulhern, Christine. 2020. "Beyond Teachers: Estimating Individual Guidance Counselors' Effects on Educational Attainment." http://papers.cmulhern.com/Counselors_Mulhern.pdf.

Nickow, Andre, Philip Oreopoulos, and Vincent Quan. 2020. "The Impressive Effects of Tutoring on PreK-12 Learning: A Systematic Review and Meta-Analysis of the Experimental Evidence." *NBER Working Paper.* https://www.nber.org/papers/w27476.

Papay, John P., Eric S. Taylor, John H. Tyler, and Mary E. Laski. 2020. "Learning Job Skills from Colleagues at Work: Evidence from a Field Experiment Using Teacher Performance Data." *American Economic Journal: Economic Policy* 12: 359-388. https://www.aeaweb.org/articles?id=10.1257/pol.20170709.

Patrinos, Harry Anthony, Emiliana Vegas, and Rohan Carter-Rau. 2022. "An Analysis of COVID-19 Student Learning Loss." *Policy Research Working Paper.* https://openknowledge.worldbank.org/bitstream/handle/10986/37400/IDU00f3f0ca808cde0497e0b88c01fa07f15bef0.pdf?sequence=1.

Penner, Emily K. 2016. "Teaching for All? Teach For America's Effects Across the Distribution of Student Achievement." *Journal of Research on Educational Effectiveness* 9 (3): 259-282. http://dx.doi.org/10.1080/19345747.2016.1164779.

Rivkin, Steven G., and Jeffrey C. Schiman. 2015. "Instruction time, Classroom Quality, and Academic Achievement." *The Economic Journal* 125 (588): F425-F448. https://doi.org/10.1111/ecoj.12315.

Rockoff, Jonah E. 2008. "Does Mentoring Reduce Turnover and Improve Skills of New Employees? Evidence from Teachers in New York City." *NBER Working Paper.* http://www.nber.org/papers/w13868.

See, Beng Huat, Rebecca Morris, Stephen Gorard, Dimitra Kokotsaki, and Sophia Abdi. 2020. "Teacher Recruitment and Retention: A Critical Review of International

Evidence of Most Promising Interventions." *Education Sciences*, September: 262. https://doi.org/10.3390/educsci10100262.

Sims, Sam, and Asma Benhenda. 2022. "The effect of financial incentives on the retention of shortage-subject." *CEPEO Working Paper* (Centre for Education Policy and Equalising Opportunities, UCL). https://www.gatsby.org.uk/uploads/education/reports/pdf/the-effect-of-financial-incentives-on-the-retention-of-shortage-subject-teachers-evidence-from-england.pdf.

Springer, Matthew G., Dale Ballou, Laura Hamilton, Vi-Nhuan Le, J. R. Lockwood, Daniel F. McCaffrey, Matthew Pepper, and Brian M. Stecher. 2010. *Teacher Pay for Performance: Experimental Evidence from the Project on Incentives in Teaching.* TN: National Center on Performance Incentives at Vanderbilt University. https://my.vanderbilt.edu/performanceincentives/files/2012/09/Full-Report-Teacher-Pay-for-Performance-Experimental-Evidence-from-the-Project-on-Incentives-in-Teaching-20104.pdf.

Whitford, Denise K., Dake Zhang, and Antonis Katsiyannis. 2018. "Traditional vs. Alternative Teacher Preparation Programs: A Meta-Analysis." *Journal of Child and Family Studies* 27: 671–685. https://doi.org/10.1007/s10826-017-0932-0.

Xu, Zeyu, Jane Hannaway, and Colin Taylor. 2011. "Making a Difference? The Effects of Teach For America in High School." *Journal of Policy Analysis and Management* 30: 447-469. https://www.jstor.org/stable/23018960.