

**Rudi Rocha de Castro**

**Empirical Essays on Human Capital and  
Development**

**Tese de Doutorado**

Thesis presented to the Postgraduate Program in Economics of  
the Departamento de Economia, PUC–Rio as partial fulfillment  
of the requirements for the degree of Doutor em Economia

Advisor : Prof. Claudio Ferraz  
Co–Advisor: Prof. Rodrigo R. Soares

Rio de Janeiro  
April 2011



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## Abstract

Rocha, Rudi; Ferraz, Claudio (Advisor); Soares, Rodrigo R. (Co-Advisor). **Empirical Essays on Human Capital and Development**. Rio de Janeiro, 2011. 146p. Tese de Doutorado — Departamento de Economia, Pontifícia Universidade Católica do Rio de Janeiro.

This thesis is comprised of three empirical articles. The first article studies the long run development impacts of a colonization policy undertaken by public authorities in the Brazilian state of São Paulo. By the late 19th century, almost 30 settlement colonies were created across São Paulo, *Neo Europes* characterized as rural villages formed by small plots of land and populated by relatively higher-skilled European settlers. The unique features of this colonialism episode enable us to support empirically the view that settlement colonies fostered long run development of settled regions through improvements in early levels of human capital. The second article examines to what extent idiosyncratic weather patterns during the time in utero have affected infant health at birth and educational outcomes in the Semiarid Northeast Brazil. We build two parallel databases. The first one is a municipality by month of birth database that combines site-specific rainfall fluctuations before birth with infant health and mortality rates. The second one combines the same weather outcomes with student level data on school attainment and achievement. We find statistically significant evidence that areas hit by negative rainfall fluctuations experience higher incidence of low birth weight, preterm gestation and infant mortality rates. We also find that adverse rainfall fluctuations when in utero are associated with lower academic test scores, higher incidence of delayed enrollment, dropout and grade repetition among young primary school students. The third article investigates whether and how armed conflict among drug gangs in Rio de Janeiro's slums affect children's educational outcomes. We explore time and geographical variation in localized violent events in order to identify causal effects of exposure to violence on students' achievement test scores and mobility across schools. We find that students from schools close to areas that experience more violence over time perform worse in standardized math exams, while no significant effect is found for language exams. Violence is also associated with higher grade repetition and dropout rates.

## Keywords

Development; Education and Health; Colonialism and European Immigration; Neighborhood Violence; Weather Fluctuations.

## Resumo

Rocha, Rudi; Ferraz, Claudio (Orientador); Soares, Rodrigo R. (Co-Orientador). **Ensaio Empírico Sobre Capital Humano e Desenvolvimento**. Rio de Janeiro, 2011. 146p. Tese de Doutorado — Departamento de Economia, Pontifícia Universidade Católica do Rio de Janeiro.

Esta tese é composta por três artigos. O primeiro deles estuda os impactos de longo prazo de uma política de colonização implementada no estado de São Paulo. Ao final do século 19, quase 30 assentamentos coloniais foram criados no estado, colônias caracterizadas como vilas rurais, formadas por pequenos lotes de terra e povoadas por imigrantes europeus relativamente mais educados. Características únicas deste episódio nos permitem mostrar empiricamente que estes assentamentos estão associados ao desenvolvimento de longo prazo das regiões de colonização via especificamente o canal de capital humano. O segundo artigo examina em que medida choques idiossincráticos de precipitação durante o período de gestação afetam saúde infantil ao nascer e educação de alunos da escola primária no Semiárido nordestino. Os resultados mostram que choques climáticos adversos diminuem o peso ao nascer, e causam uma maior incidência de mortalidade infantil. Também encontramos impactos negativos sobre aprendizado, evasão e reprovação escolar. O terceiro artigo investiga o impacto da violência associada ao tráfico de drogas no Rio de Janeiro sobre o desempenho educacional em escolas mais expostas aos conflitos entre facções criminosas. Os resultados indicam que violência tem um impacto causal negativo sobre desempenho escolar em matemática, enquanto que nenhum efeito é encontrado sobre o desempenho em português. Também encontramos que a violência é associada a probabilidades mais altas de reprovação e evasão.

## Palavras-chave

Desenvolvimento; Educação e Saúde; Colonialismo e Imigração Européia; Violência Local; Choques Climáticos.

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