

What do we know about the effectiveness of fiscal incentives for research and development in Brazil's 'Law of Good'?

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Fiscal incentives are widely adopted in many countries to promote corporate investments in research and development (R&D). According to the Organisation for Economic Co-operation and Development (OECD),¹ over 46 countries adopt these policies, including Brazil, Canada, Chile, China, almost all members of the EU, Korea, Mexico, Russia, the US, the UK, and New Zealand.

Bloom, Van Reenen and Williams (2019) synthesised the available empirical evidence regarding the efficacy of various types of policies in support of R&D. According to them, there are many high-quality studies in the literature that deal with fiscal incentives. In addition, the evidence in these studies demonstrates that fiscal incentives have a positive impact on innovative capacity.

In Brazil, fiscal incentives for R&D were instituted by Law No. 11.196, enacted in 2005—also known as the 'Law of Good' (*Lei do Bem*). Chapter III of this law created a series of tax reduction mechanisms for Brazilian companies to invest in R&D, both directly and through the acquisition of R&D from other institutions or facilities. The main mechanism consists in the possibility of deducting from the tax base all investments made in R&D activities that are classified as operational expenses.

This Policy Research Brief presents a review of studies carried out in Brazil regarding the effectiveness of these incentives— are they working?

1 Impacts of the law's fiscal incentives

Fifteen years after the enactment of the Law of Good, there are few studies that purport to assess the efficacy of fiscal incentives on R&D investments in businesses located in Brazil.

Corporate investments in R&D have increased over the years. In the early 2000s, before the creation of fiscal incentives and of various other policies in support of innovation, they represented around 0.5 per cent of Brazil's gross domestic product (GDP). This amount increased to about 0.6 per cent of GDP in 2016.

However, it is still unclear that this growth is sustainable. The latest Survey of Innovation (*Pesquisa Industrial de Inovação Tecnológica—PINTEC*) released by the Brazilian Institute of Geography and Statistics (IBGE), covering the years 2015 through 2017, points to a significant reduction in these investments.

A total of 12 studies analysed the Law of Good in recent years, all published after 2010. Many of them used data from PINTEC to quantitatively assess the impacts of the law. Although it was enacted in 2005 and PINTEC is carried out every three years (2005, 2008, 2011, 2014 and 2017 are the most recent ones), its dissemination lags behind by two years.

Therefore, the first outcomes of the Law of Good could only be effectively measured in 2010, when the 2006-2008 PINTEC was released—the first upon which the impact of the law on corporate innovation could be assessed.

The number of available studies that assess the effectiveness of the Law of Good is still small. A recent study by Bin et al. (2019) sought to identify all assessments of science, technology and innovation policies carried out in Brazil as part of a global initiative to map this type of evaluation.² Authors identified nine studies on fiscal incentives for R&D in Brazil, four of them under the Law of Good.

There could be substantially more studies if information on which companies received the benefit was adequately published on the websites of the Ministry of Science, Technology, and Innovation or of the Ministry of the Economy, similar to how the National Development Bank (*Banco Nacional de Desenvolvimento Econômico e Social—BNDES*) discloses its credit operations.

Generally, most studies use what is considered the gold standard in the evaluation of the effectiveness of public policies: a comparison between the performance of beneficiary companies and a control group of non-beneficiary companies. If beneficiary companies perform better regarding a given variable (for example, R&D and innovation), this means that the law is effective.

All 12 studies reached the same conclusion: the fiscal incentives in the Law of Good are effective in increasing private investment in R&D or innovation in beneficiary companies.

Among the studies that estimate the percentage increase of investments, the lowest result was that the Law of Good leads to an increase of 7 per cent in corporate investment (measured by the increase in number of researchers), and the highest result pointed to an increase in 80 per cent in R&D expenditures.

No study concluded that the Law of Good is not effective. Santos et al. (2020) concluded that the law increases the chances of corporate innovation, and Zucoloto et al. (2017) found positive impacts on the productivity of beneficiary companies.

TABLE 1

Impacts of the Law of Good according to various studies using best international practices to evaluate public policies

Study	Impacts of the law
Santos et al. (2020)	Higher probability of innovating in products and processes
Gama and Cruz (2018)	Increase the investment in R&D in beneficiary companies by BRL1 million
Zucoloto et al. (2017)	17% increase in corporate R&D investments (as a share of revenue) Increased productivity
Kannebley Júnior, Shimada and De Negri (2016)	Increase of 43% to 81% in R&D expenditures, and of 9% to 10% in scientific technical personnel involved in R&D (PoTec)
Kannebley Jr. and Porto (2012)	Average increase in PoTec of 7% to 11%

Source: Author's elaboration.

Some studies, despite also having found positive results, were carried out based on the analysis of aggregate data on R&D investments in the Brazilian economy, interviews with beneficiary companies, or even just interviews with beneficiaries. However, these are not adequate methodologies to assess policy effectiveness.

In Brazil, investments carried out under the Law of Good's fiscal incentives represent around 36 per cent of the country's total investment in R&D, according to Araújo, Rauen and Zucoloto (2016). Using this percentage and the law's estimated impacts on R&D investment in beneficiary companies, authors estimated that, had the law been suspended, it would have caused a reduction of over BRL1 billion in R&D investments in the country in 2016.

Only two studies did not find positive impacts on R&D investments, and both assess many other government policies for innovation. For example, Rocha and Rauen (2018) evaluated, based on aggregate data, all tax benefit policies geared towards R&D on some level, and concluded that increased fiscal benefits did not lead to more innovation.

However, it is not possible to extend this analysis to the Law of Good, because its fiscal benefits did not increase in the period considered by the authors. The tax incentives that were expanded during the period were those geared at the automotive sector and at the IT Law (*Lei de Informática*), which likely explains the negative results obtained, given that available studies on the IT Law (such as Salles Filho et al. 2012) did not find positive results on R&D investments.

Rocha (2015) also sought to evaluate the entire set of public measures geared at innovation (credit, subsidies, tax benefits). Likewise, it did not find positive results. By analysing a broad set of very heterogeneous policies, none of the works mentioned can be considered adequate to assess the Law of Good specifically.

Annex 1 provides further detail about all 12 studies available in Brazil that analyse the outcomes of the Law of Good. The table details the objectives of each study, the methodology used, and the outcome variable observed by the authors, among other characteristics.

2 What conclusions can be drawn about the effectiveness of the law?

The analysis of studies that were carried out on the effectiveness of the law, especially those that used methodologies that are more adequate to this type of evaluation, concluded that it has positive effects on private R&D investments and on the likelihood of beneficiary companies innovating.

However, it is known that corporate investments in R&D also depend on a series of other macroeconomic and structural factors of the Brazilian economy. The weak performance of R&D investment observed in the latest PINTEC can be attributed to these other factors.

On the other hand, further evaluations must be carried out regarding the effectiveness of the law, from various perspectives (sectoral, company size, volume of investment and incentives, among others), so that this instrument can be improved.

At this point in time, when the relevance of various fiscal incentives is being discussed, as well as a possible reduction of their burden on revenue, it is crucial not to discard or eliminate those policies that do work.

1. See: <<https://www.oecd.org/sti/rd-tax-stats.htm>>.

2. See: <<https://www.si-per.eu/siper-en/index.php>>.

ANNEX 1

Currently available Brazilian studies analysing the outcomes of the Law of Good

Study	Objective	Performance variable	Methodology	Outcomes	Period analysed	Number of analysed companies	Notes
Kaveski, Lopes and Beuren (2020)	Analyse the effects of the incentive on corporate performance	Return on capital, return on assets, and return on equity	Logistic regression. Dependent variable: use of incentives	Positive correlation between financial performance indicators and the use of the Law of Good (dependent variable in the model). Suggests that better-performing companies are more likely to use incentives, but not that incentives increase performance	2006-2014	494 companies listed in the São Paulo stock exchange (<i>Brasil Balcão</i>)	The models do not explain the effects of the incentive on performance, but rather the effects of the performance indicators on the use of the incentive. Only suggests a positive correlation
Santos et al. (2020)	Impact of the Law of Good on large companies' propensity to innovate	Product and process innovation	Probabilistic models (Logit)	Beneficiary companies are more likely to innovate on products, but this impact was not restricted to sectors with average-high technological intensity. The law had positive effects on innovation in corporate processes in companies in less technological sectors	2010-2016	Around 1,500 companies with over 500 employees	Does not observe an impact on R&D investment and analyses only large companies
Da Silva and Ruffoni (2020)	How do companies evaluate fiscal incentives?	Decision to innovate and relevance of incentives	Qualitative interviews	The law does not influence the decision to conduct R&D, but has effects on the volume of investment	2006-2012	38 companies in Rio Grande do Sul	Qualitative study. Does not evaluate the effectiveness of the policy, but rather the perception of companies about it
Porto and Memoria (2019)	Analyse the relationship between R&D investments and innovation results in beneficiary companies	Product and process innovation	Logistic regression. Dependent variable: product and process innovation	Among beneficiary companies, investments on R&D, in human resources, and the size of the company influence the propensity to innovate in products and processes	2009-2013	1,978 beneficiary companies	Does not analyse the efficacy of the Law of Good. Only shows positive effects of R&D investments on innovation, which would be expected in other groups of companies
Gama and Cruz (2018)	Investigate whether incentives alter the composition of corporate investments on innovation, the hiring of qualified personnel as well as investment results	Investment in innovative activities; number of researchers; type of innovation (product or process)	Propensity score matching with difference-in-differences and estimation of average treatment effects	Fiscal incentives increased R&D investments in beneficiary companies by approx. BRL1 million. This increase occurred together with a reduction in investment in other innovative activities, such as acquisition of external knowledge. No effects on the number of researchers or on the type of innovation were identified	2008-2011	About 6,000 companies that invested on R&D in 2008 and 260 companies that received the benefit that year	Gold standard in evaluating public policies, with controls for selection bias. However, it does not evaluate policy effectiveness, but rather its effects on investment composition
Rocha and Rauen (2018)	Impact of fiscal incentives on R&D investments	R&D/GDP	Synthetic treatment group based on aggregate data	The increase in the volume of fiscal incentives in Brazil during the period (esp. the IT Law and automotive incentives) did not result an increase in R&D investments	2010-2015	Does not use data on individual companies	Aggregate study. Evaluates all fiscal incentives (not only the Law of Good). The IT Law must be crucial in the outcome, as it was the one that grew the most, together with automotive incentives

Study	Objective	Performance variable	Methodology	Outcomes	Period analysed	Number of analysed companies	Notes
Zucoloto et al. (2017)	Analyse the impact of fiscal incentives on R&D investments and corporate productivity	R&D/corporate revenue of beneficiary companies and total factor productivity	Propensity score matching with fixed effects	The Law of Good increased private R&D investments in beneficiary companies by 17% as a share of revenue. Positive effects on productivity	2006-2013	About 1,100 beneficiary companies	Gold standard for impact evaluation. Observed fewer impacts than what was previously observed in the literature. Suggests a loss of efficiency in the law resulting from the increased beneficiary base
Araújo, Rauen and Zucoloto (2016)	Estimate the drop in private R&D investments resulting from the hypothetical discontinuation of the law	Corporate investment on R&D—aggregate data	Application of additionality foreseen in Kannenbley and Porto (2012) to the percentage of R&D invested by beneficiary companies	Investment under the Law of Good represents 36.1% of corporate R&D. Since the law increases R&D investment by 11%, its extinction would lead to a decrease of BRL1 billion in corporate R&D development	2016	Aggregate R&D investment data	Did not carry out a new estimation of the impact of the law, but applied literature estimates on the aggregate value of R&D investment
Kannenbley Júnior, Shimada and De Negri (2016)	Effects of the law on beneficiary companies' R&D investments	Investment on R&D and scientific technical personnel involved in R&D	Propensity score matching	Increase of 43% to 81% in R&D expenditures and of 9% to 10% for scientific technical personnel involved in R&D	2006-2008	Over 6,000 beneficiary companies	Gold standard in policy evaluation
Rocha (2015)	Estimate the effect of government support on corporate R&D investments	R&D development and/revenue of companies benefitting from public policies	Creation of a treatment group with the same companies in distinct periods + ordinary least squares	Did not find evidence of positive effects of public support on R&D investment	2005 and 2008	243 companies that received government support in 2005 or 2008	Analyses government support as a whole (credit, subsidies, fiscal incentives, etc.)
Kennebley Jr. and Porto (2012)	Evaluate the impact of fiscal incentives (Law of Good and IT Law) on beneficiary companies' R&D investments	Scientific technical personnel involved in R&D	Ordinary least squares and Tobit with fixed effects	Average increase of between 7% to 11% of scientific technical personnel involved in R&D	2006-2010	1,059 beneficiary companies	Does not observe R&D investment directly, but rather a proxy—qualified personnel in companies
Calzolaio and Dathein (2012)	Evaluate whether the Law of Good increased innovation in beneficiary companies	Rate of innovation in the economy, R&D investment, patenting, and personnel involved in R&D	Event studies (comparison between before and after the enactment of the law)	Observes growth across all variables after the enactment of the Law of Good	2005 (before the law) and 2008 (after the law)	Does not specify the number of companies	Uses only aggregate data. Does not deal with selection bias (does not create control groups). Not adequate for the study's purpose (which is to evaluate the law)

Source: Author's elaboration.

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