

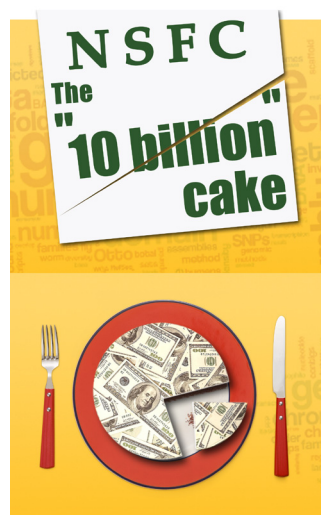
# Letter to the Editor

## The “10 billion” cake: National Natural Science Foundation of China

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The National Natural Science Foundation of China (NSFC) was founded 25 years ago to promote innovation and to provide a mechanism for fair competition. Prior to that, allocation of financial resources to research institutions and programs was largely decided by the government. The establishment of the NSFC gave more power to individual scientists, and represented a major advance in the move towards “democracy” in science.

Basic research funding via NSFC reached 9,465 million RMB in 2010. The following is a summary of the historical data, obtained using a custom-designed search platform developed by Dingxiangyuan (dxy.cn).

### The growing cake – a historical perspective

Two years after the Great Cultural Revolution ended in China, 89 prominent scientists wrote a letter to the Chinese Communist Party Central Committee and the State Council, advocating the establishment of a national natural science foundation. Eight years later (on February 14, 1986), the State Council issued a formal notice to expand the then “Science Bureau” of the Chinese Academy of Sciences to the National Natural Science Foundation of China. The NSFC became a public service unit that reports directly to the State Council.

The government funding via the NSFC increased from 1986 to 2010 (Fig 1), at an impressive rate of >21% per year. In the past ten years, the biggest annual percent increase was 46% in 2002, followed by 30% in 2010. The total funding reached close to 10 billion RMB in 2010. In addition to total budget, the number of funded programs and the mean size of the grants were also on the rise. Budget growth at the National Institutes of Health (NIH) and National Science Foundation (NSF) in the US is at a much slower pace (Fig 2).

### Who ate the cake?

*40% cake was taken by the “big brother” and the “10 sisters”*

In contrast to the monopoly of state-run programs by a few researchers at the very top, such as National High-Tech R&D Program (863 Program) and National Basic Research Program of China (973 Program), the NSFC is relatively independent. The review process is relatively fair, with less administrative interference. Another key difference is the “bottom-up” approach: individual scientists are free to initiate and propose a research program on their own.

No potential conflict of interest.

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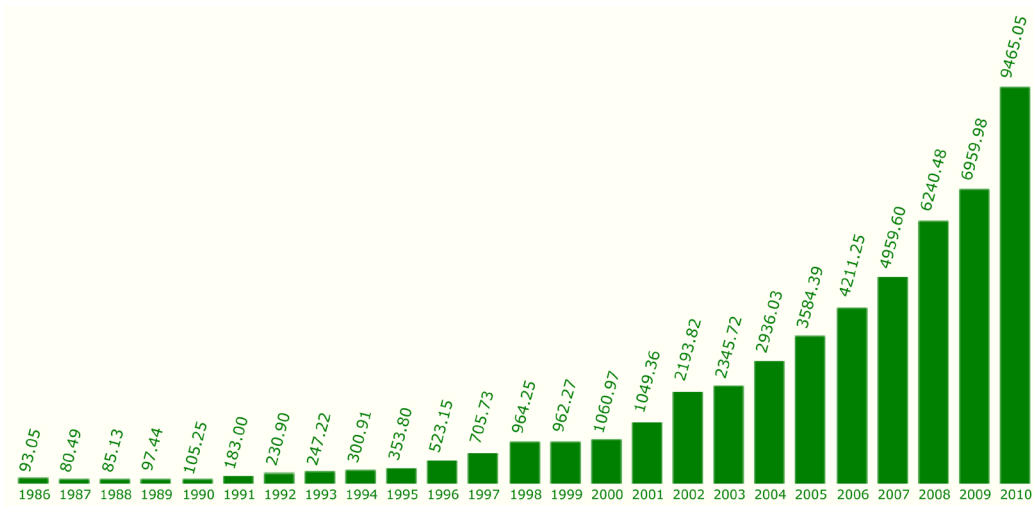


Fig 1. The government funding via the NFSF increased from 1986 to 2010 (Million RMB).

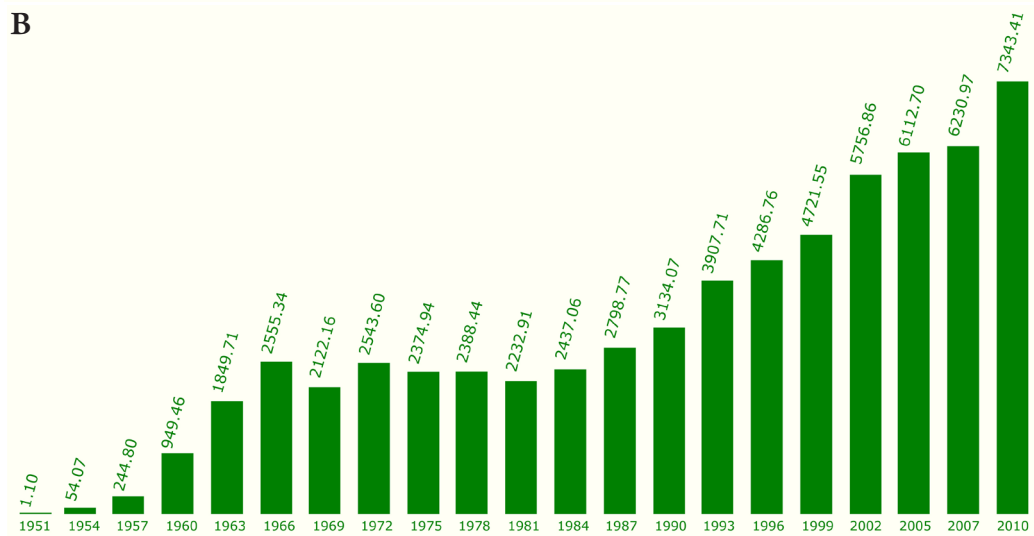
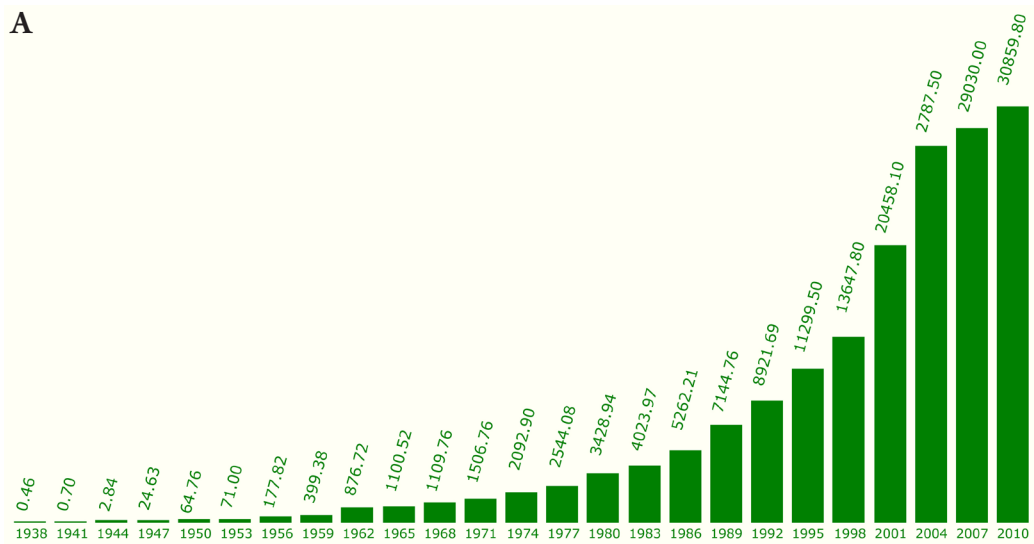


Fig 2. (A) The funding via the NIH increased from 1938 to 2010 (Million USD); (B) The funding via the NSF increased from 1951 to 2010 (Million USD).

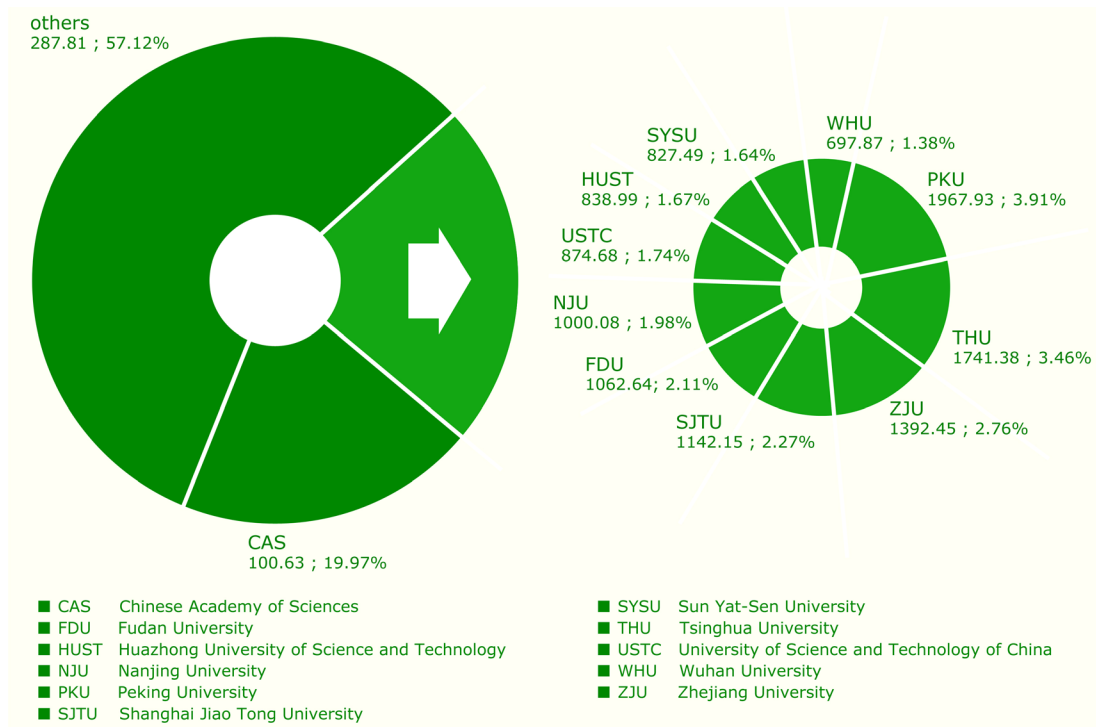


Fig 3. 40% cake was taken by the "big brother" and the "10 sisters" (Million RMB).

Table 1. The "10 sisters" – top ten Chinese universities in terms of funding from the NSFC

Institute	Number of Projects	Total Funding (million yuan)	Funding per project (thousand yuan)
Beijing University	6,668	1,967.9	295.1
Tsinghua University	5,714	1,741.4	304.8
Zhejiang University	5,572	1,392.5	249.9
Shanghai Jiaotong University	4,428	1,142.5	257.9
Fudan University	4,138	1,062.6	256.8
Nanjing University	3,193	1,000.1	313.2
University of Science and technology of China	2,183	874.7	400.7
Huazhong University of Science and Technology	3,579	840.0	234.4
Sun Yat-Sen University	3,315	827.5	249.6
Wuhan University	2,862	697.9	243.8
Total	41,652	11,545.7	277.2

Our independent search shows that NSFC has invested over 50.3 billion RMB in a total of 191,259 projects. The funding rate remained relatively stable at 25%. A cross-sectional analysis indicated that 20% of the total funding was made to the absolute tycoon: the Chinese Academy of Sciences nicknamed "big brother" (Fig 3). Within the remaining 80%, 20% is taken by the 10 most prestigious universities nicknamed "10 sisters" (Table 1).

**Funding in medical and life sciences**

In 1986, the NSFC allocated slightly over 15% to medical and life sciences (Fig 4). For the past 4 years, this rate remained at a level of >35%. All together, 31,760 programs in medical sciences received 7.74 billion RMB; 36,783 programs in life sciences received 9.37 billion RMB.

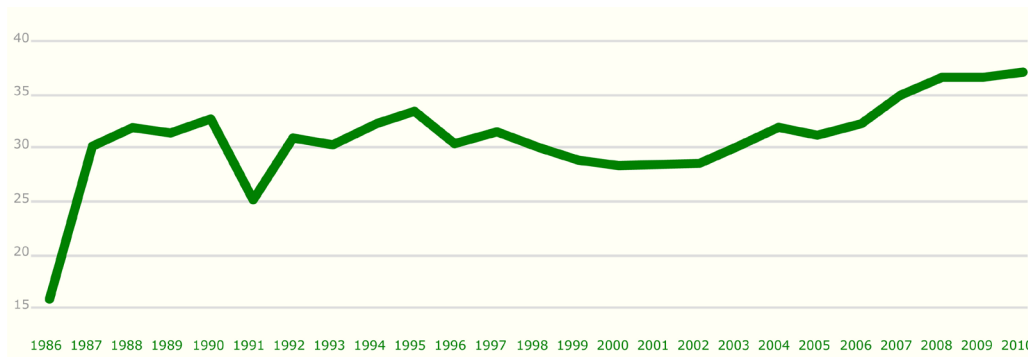


Fig 4. The proportion of the approved project for the subjects of medical and life sciences in NSFC since 1986 (%).

## Conclusion

Research funding policy in China has recently been challenged by increasingly more scientists, both home and abroad. A number of comments and criticisms have been published in high-impact journals, e.g., *Nature* and *Science*, and received attention by the research community as well as funding agencies. There has been some rumor that NSFC is planning a series of reforms. Total budget is expected to increase further. Support for individual programs is expected to increase to 600~800 thousand RMB. Support duration for general programs is

expected to increase from three to four years from 3. Another key change under consideration is the limitation of simultaneous/overlapping grant application from two to one. These changes would benefit the "small potatoes" and starting researchers. Are you ready to grab a piece of the ever-growing cake?

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