

# Reform and Innovative Construction in the structure of Chinese Higher Education

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- The popularization of higher education during 1998-2004 is a significant event in the history of Chinese higher education. The question, how to evaluate the popularization, has become a hot topic which need more exploration. It is also a topic highly debated both in China and in the world in recent years.



- One of the most serious criticisms is that the popularization of the higher education causes the quality decline of Chinese higher education. It is surprising that there are so many negative comments on the popularization.



- Most the criticisms and comments are based on personal feelings rather than empirical evidences. In fact, the popularization has brought great changes to Chinese higher education. These changes will make significant contribution to the creative development of higher education in coming years .



- The structural change is one of the most important changes and also one of the most significant contributions. It will provide a new perspective to Chinese higher education.



中国高等教育的这种结构变化与创新  
主要体现在以下几个方面：

**The changes and innovation in the structure  
of Chinese higher education are mainly  
manifested in the following aspects:**

- 第一、重点的高水平大学与一般大学之间学生规模的结构优化  
**First, structural optimization in size of students  
in key universities and other universities.**
- 第二、高等教育的学科结构进一步优化与合理  
**Second, further structural optimization of different disciplines  
in Chinese higher education system.**



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manifested in the following aspects:**

- 第三、高等教育的层次结构得到了进一步的调整和优化

**Third, further adjustment and optimization of  
hierarchical structure of Chinese higher education.**

- 第四、中国高等教育的布局结构进一步合理

**Fourth, improvement on the rationality of the  
distribution of higher education resources.**



高等教育结构的变化将为整个高等教育的创新提供一个非常坚实的平台，形成十分良好的制度保障，以及更加广阔的发展空间。

The structural changes of higher education will provide a solid platform, an excellent systematic protection, as well as a larger space for the educational innovation and development.





中国高等教育在大众化的过程中，不仅完成了规模的扩大，更加重要的是进行了一个非常重要的高等教育的结构调整和变化，这种结构上的调整和优化本身即是一个高等教育的创新，同时也为中国高等教育的创新建设形成了一个非常好的基础。

In the process of popularization, Chinese higher education undergoes an expansion of students' enrollment size, and more important, structural adjustment. Such structural adjustment and optimization are very innovative, and they provide a better platform for the further improvement of Chinese higher education.



◆ 第一、重点的高水平大学与一般大学之间学生规模的结构优化

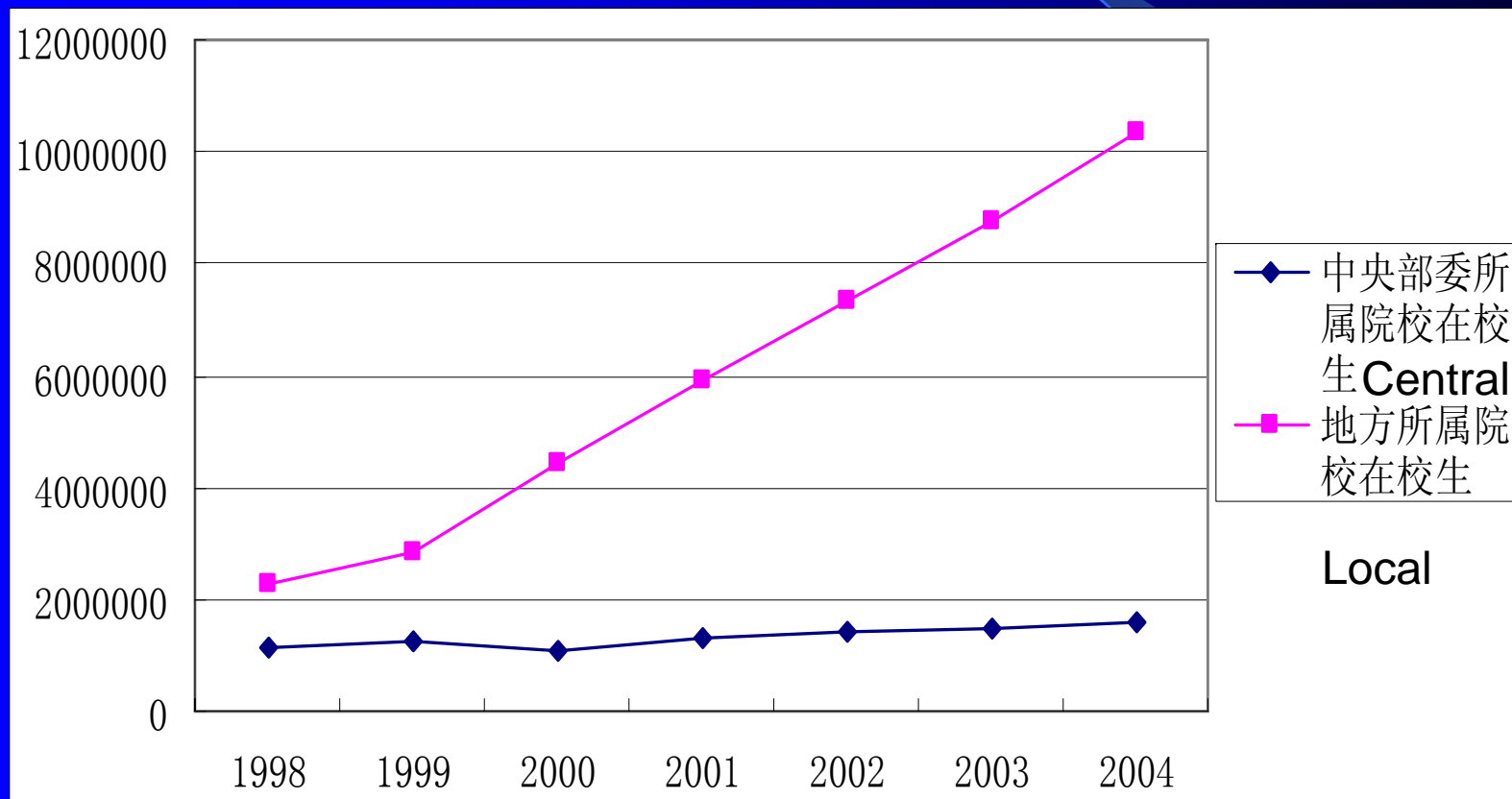
**First, structural optimization in students' size in the key universities and other universities**



年 Year	中央部属院校 Universities funded by Central Government			地方所属院校 Universities funded by local Governments				
	学校数 No. of Universities	在校生数 No. of Registered Students			学校数 No. of Universities	在校生数 No. of Registered Students		
		合计 Total	本科生 Undergraduates	专科生 Junior College students		合计 Total	本科生 Undergraduates	专科生 Junior College students
	263	1,150,876	974,613	176,263	795	2,257,888	1,260,034	997,854
1998	248	1,242,943	1,073,438	169,505	823	2,842,931	1,650,983	1,191,948
1999	116	1,105,765	975,676	130,089	925	4,455,135	2,424,505	2,030,630
2000	111	1,280,041	1,120,388	159,633	1,114	5,910,617	3,123,356	2,787,261
2001	111	1,404,879	1,260,607	144,272	1,154	7,311,299	3,981,715	3,329,584
2002	111	1,502,345	1,365,215	137,130	1,268	8,771,582	4,607,134	4,164,448
2003	111	1,567,794	1,443,839	123,955	1,394	10,369,095	5,302,911	4,661,184
2004	111	1,567,794	1,443,839	123,955	1,394	10,369,095	5,302,911	4,661,184



# Number Changes of Students in Universities Funded by Central Government and Local Governments from 1998 to 2004



从这里的两张图表可以发现，通过高等教育大众化，中国的高等学校系统中，重点的学术型大学的学生数量与一般大学学生数量的比例已经达到了一个比较理想的结构关系。

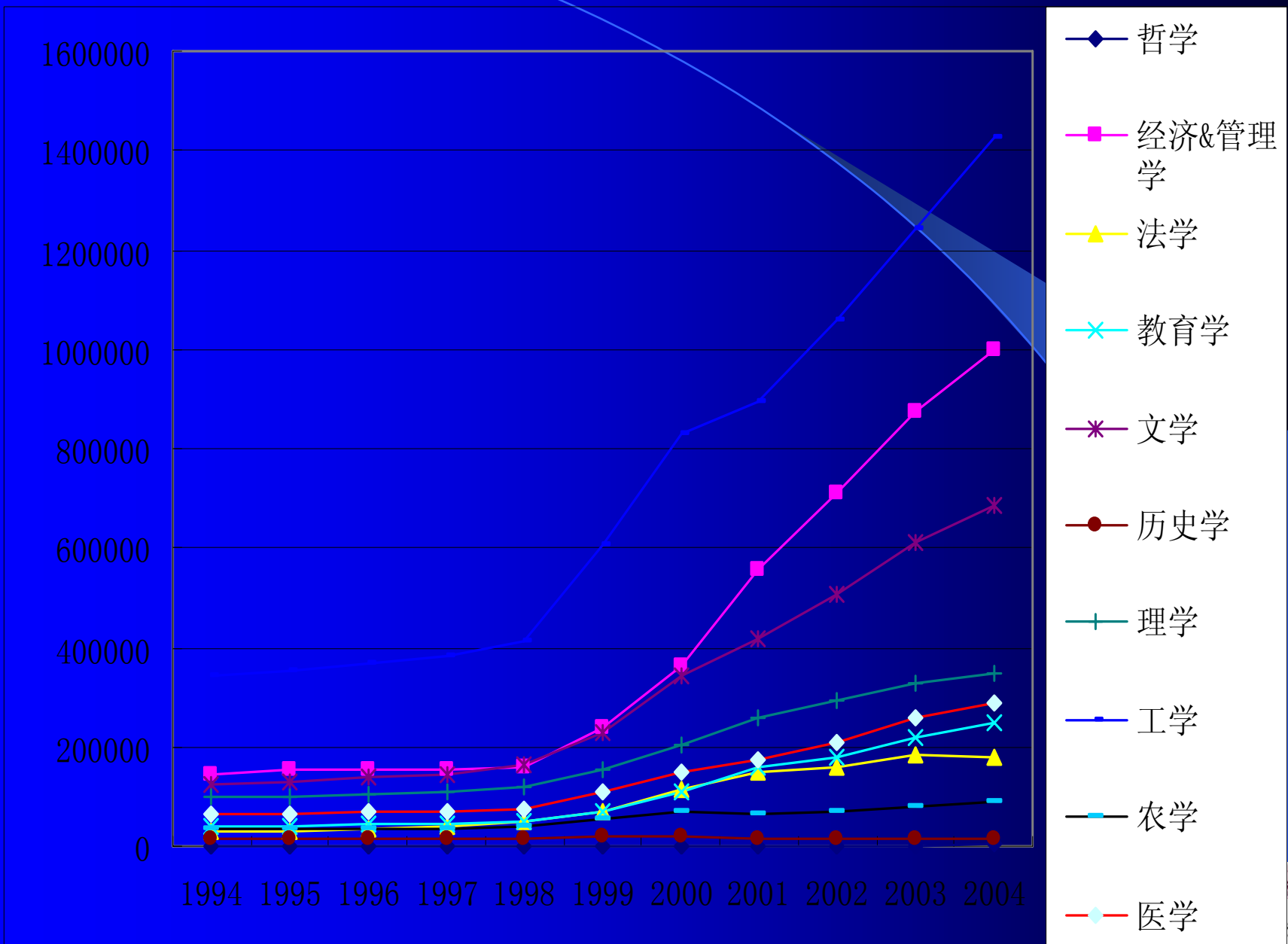
The two diagrams show that following the popularization of Chinese higher education, there is a relatively satisfactory proportion of the allocation of students in the key universities and other universities  
**(1998:34%/66%; 2004:13%\87%)**



## ◆第二、学科结构进一步优化与合理

**Second, further structural optimization of different disciplines in Chinese higher education system. The number of students in engineering and technical disciplines is still the largest. The number of students in Philosophy and history is smaller than any other disciplines. However, changes are very clear in disciplines like liberal arts, nature science, applied science and basic science.**





**The graph reflects that changes of student size in different disciplines are decided by their original conditions. This model is valid in the early stage of the process of Chinese higher education popularization.**





首先是高等教育中文科和理科之间学生规模结构的调整 和  
优化

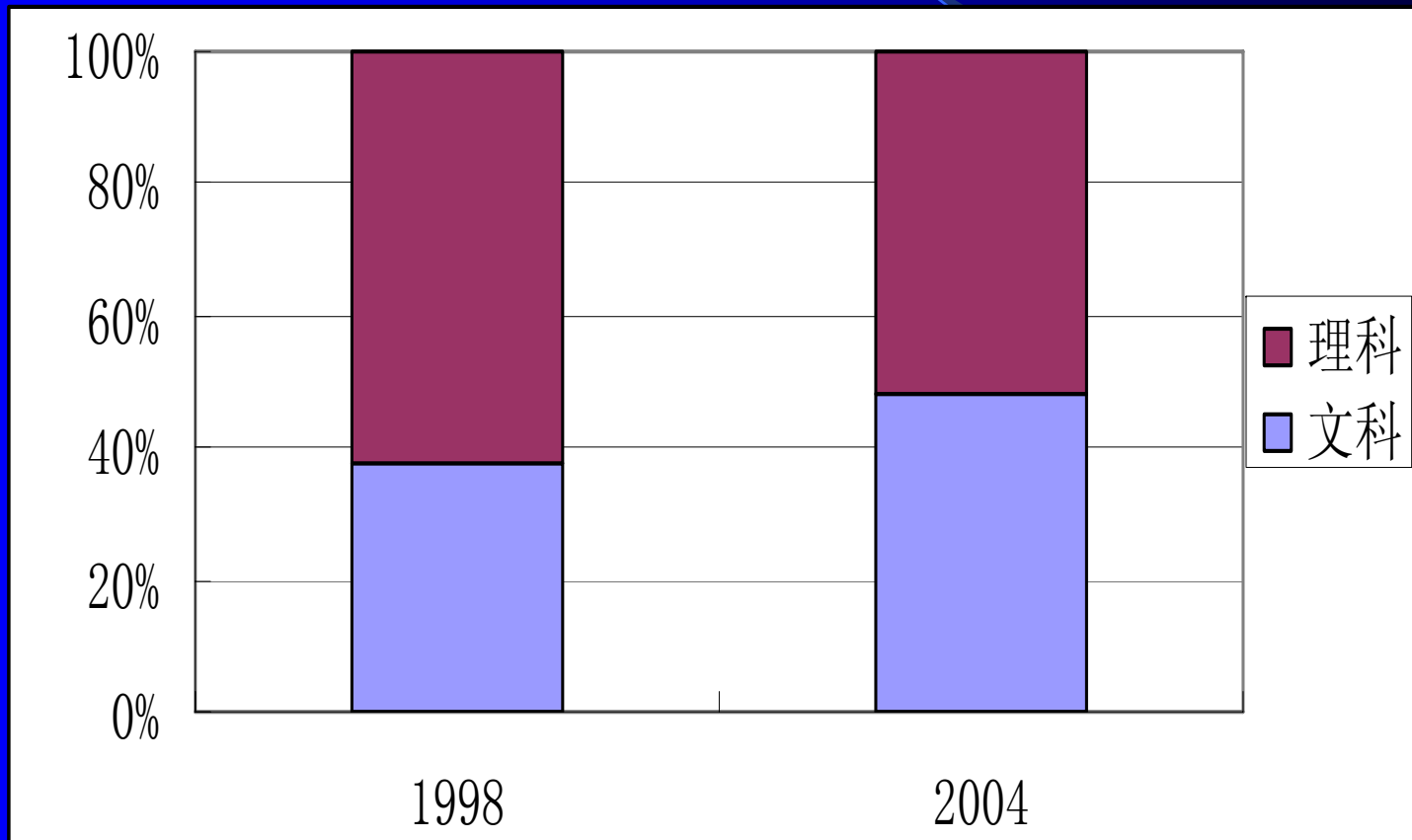
**First, Adjustment and optimization of the structure  
and student number between liberal arts and  
sciences in Chinese universities.**

其次是高等教育中基础学科与应用学科之间的结构关系

**Second, structural relations between basic and  
applied disciplines in Chinese universities.**



# Proportion of Students of Science and Liberal Arts in 1998 and 2004

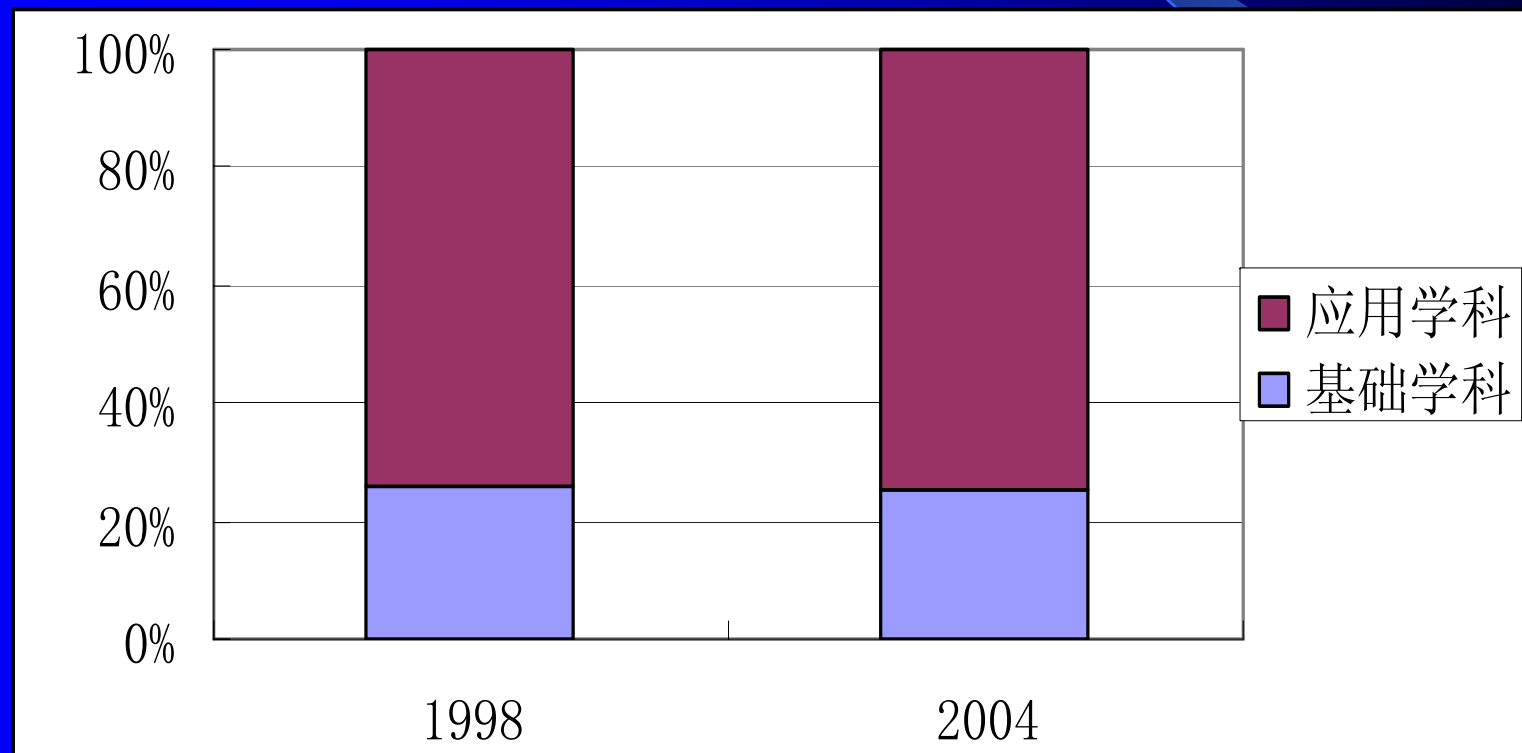


- 从图中可以清楚地看到，**1998**年理科和文科的比例是**1.64:1**，理科规模明显超出文科；**2004**年，这一比例变为**1.07: 1**,文理科规模基本持平。这个变化是比较明显的，也是中国高等教育结构在高等教育大众化过程中的一个非常重要的变化。

**We can see clearly from the table, in 1998, the number of students of sciences far exceeded that of students of arts, and the proportion is 1.64:1. However, in 2004, the proportion was 1.07:1, a near-zero disparity. It is a noticeable and significant structural change of higher education in the process of popularization.**



# Proportion of Applicable and Basic Disciplines in 1998 and 2004



- **1998年二者的比例是1: 2.88，2004年二者比例达到1: 2.98，虽然变化并不显著，但是还是可以看到应用学科的比例有上升的趋势。**

**In 1998, the proportion of the students of applicable sciences to that of basic sciences is 1:2.88, whereas the proportion changed to 1:2.98 in 2004. Although the change is not so remarkable, we can still find the rising popularity of basic sciences among university students.**

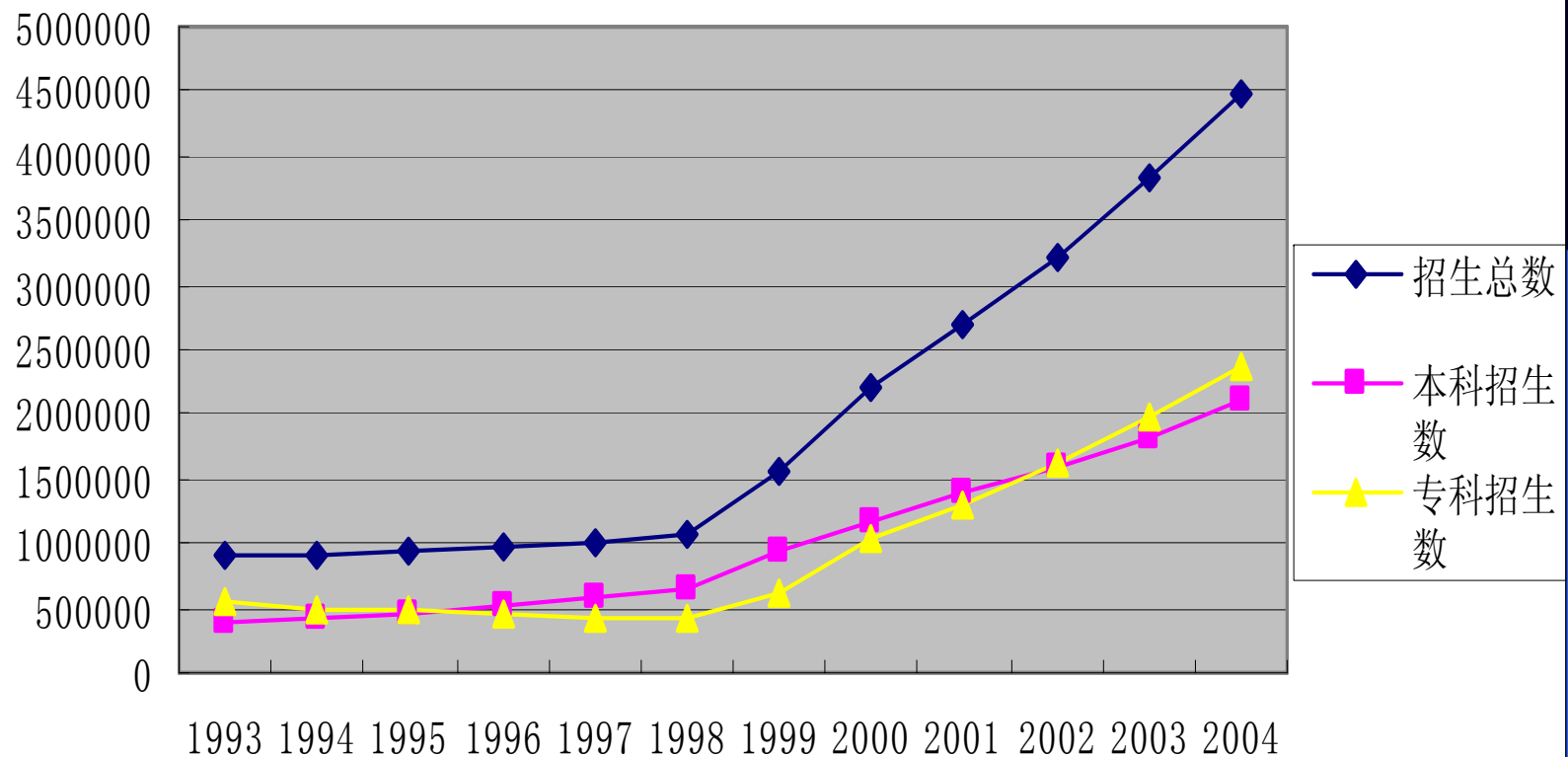


◆第三、高等教育的层次结构得到了进一步的调整和优化

Third, further adjustment and optimization of the hierarchical structure of Chinese higher education.



# College Students Enrollment from 1993 to 2004



- 中国1998年和2004年的高等教育本、专科在校生规模。1998年本科在校生223万人，至2004年增至736万人，扩大了3.3倍。1998年专科在校生117万人，2004年达到548万人，扩大了4.7倍。

**The change of the numbers of College Students' Enrollment from 1998 to 2004 : the number of undergraduates in 1998 is 2, 23 million, and the number increased by 3.3 times (7,36 million ) in 2004. The number of community college students in 1998 was 1,17 million, and the number went up by 4.7 times ( 5.48 million).**

- 在中国高等教育的层次结构的调整 and 变化过程中，值得注意的是各个不同学科中层次结构的改善和变化。

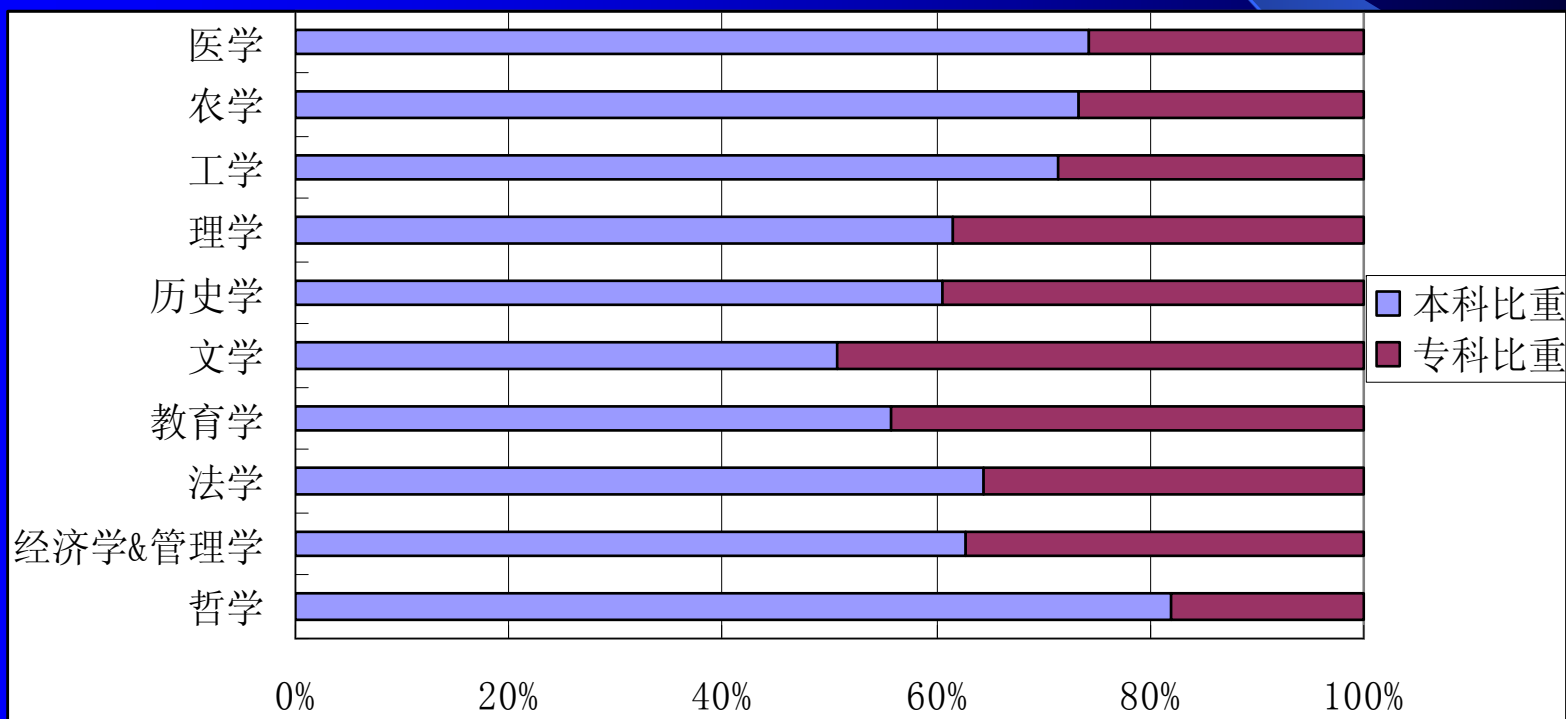
**The improvement and change of hierarchical structure in different disciplines are quite noticeable in the process of popularization of Chinese higher education,**





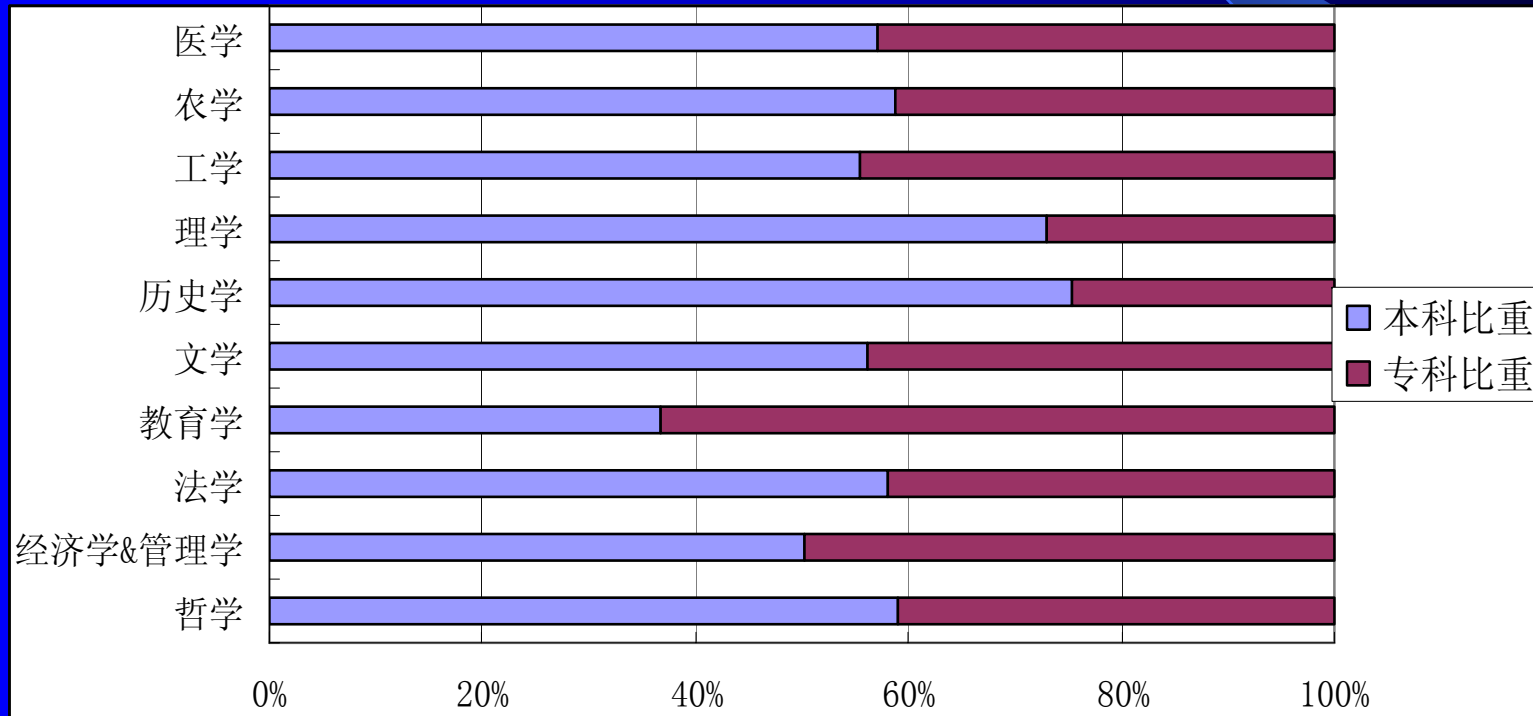
# 1998年10大学科门类本专科在校生规模比例

## Proportions of College students in 10 major disciplines in 1998



# 2004年10大学科门类本专科在校生规模比例

## Proportions of College students in 10 major disciplines in 1998



- 第四、中国高等教育的布局结构进一步合理

Fourth, the resource distribution of Chinese education is more effective.

- 这种布局结构的变化和优化也是反映一个国家高等教育质量，特别是它的公平性的重要方面，通过高等教育的大众化，中国高等教育的这个指标也得到了比较明显的改善。

The change of distribution reflects the quality of Chinese higher education, and the improvement of education equity.



- Changes of distribution are reflected in two aspects:
- First, balance between economy and the size of students;
- Second, balance between the size of population at the age of 18-22, and the size of university students.



- First of all, the balance between economy and the scale of students has been improved in these years.



表1：1998年各省在校生比例和GDP比例  
(之二)

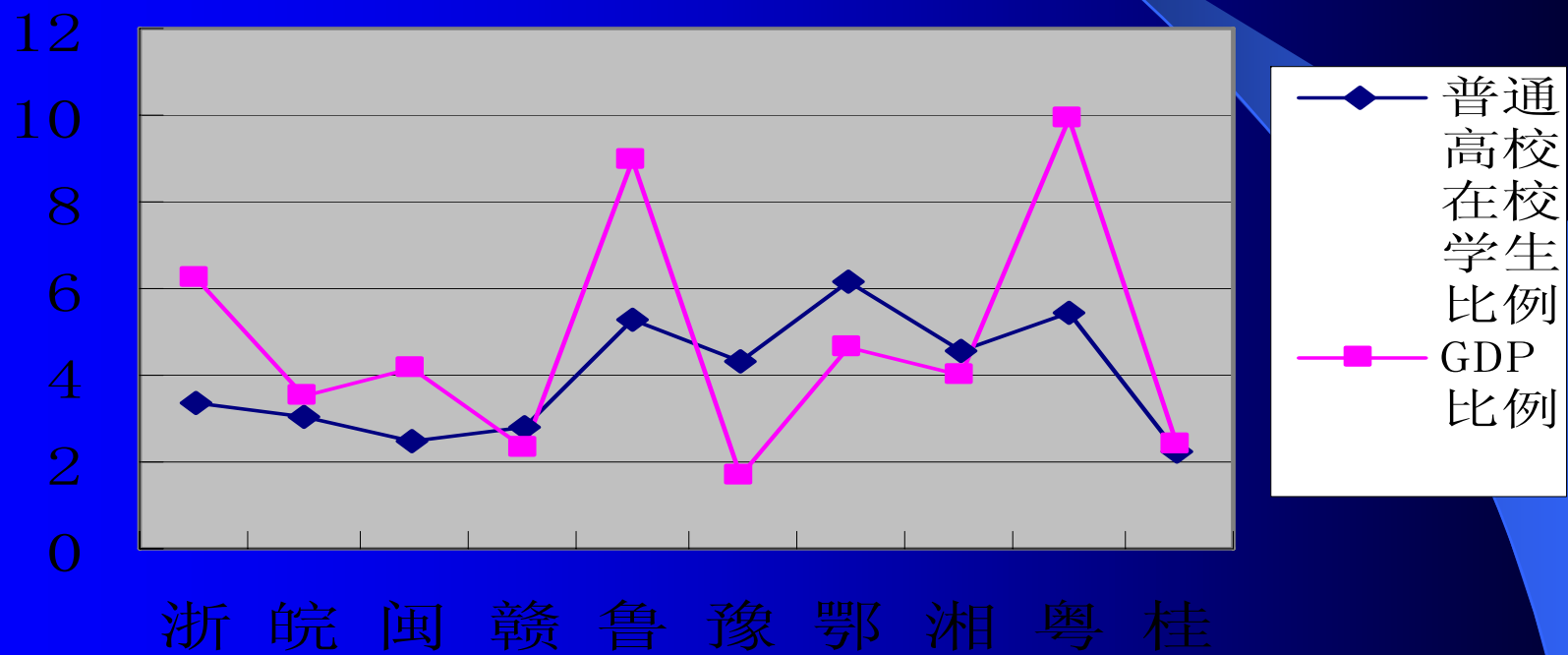


表1：1998年各省在校生比例和GDP比例  
(之一)

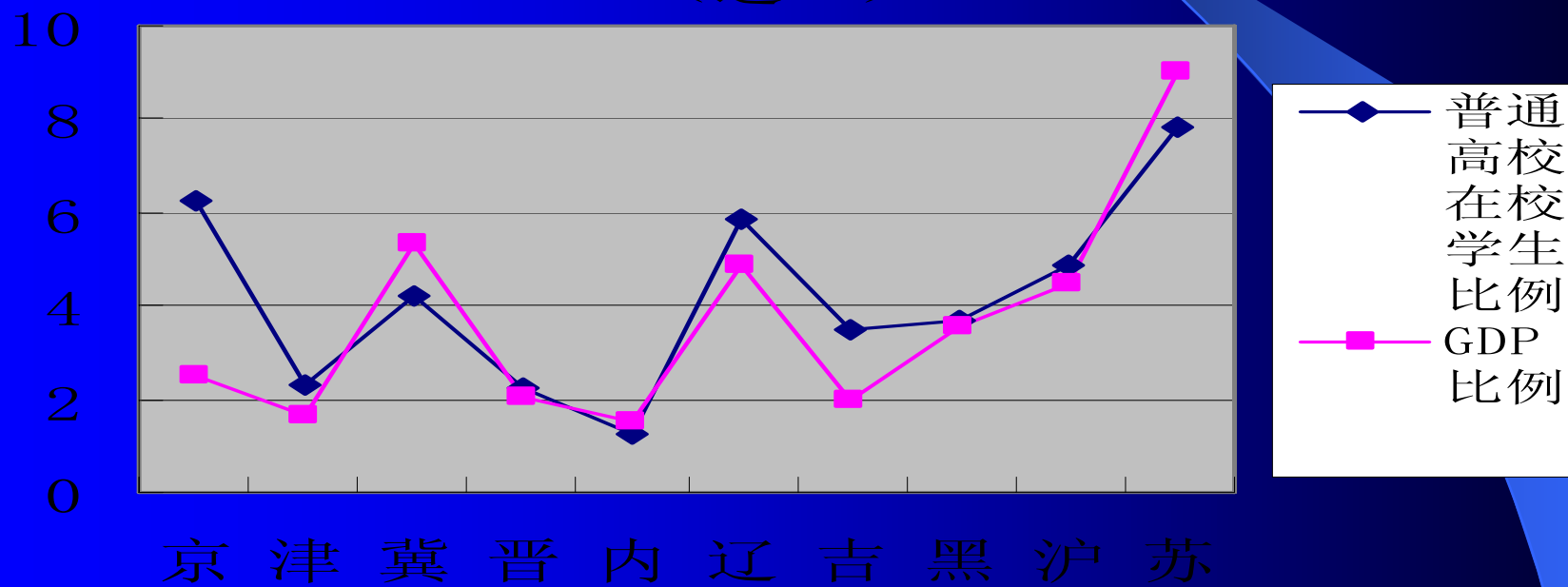


表1：1998年各省在校生比例和GDP比例  
(之三)

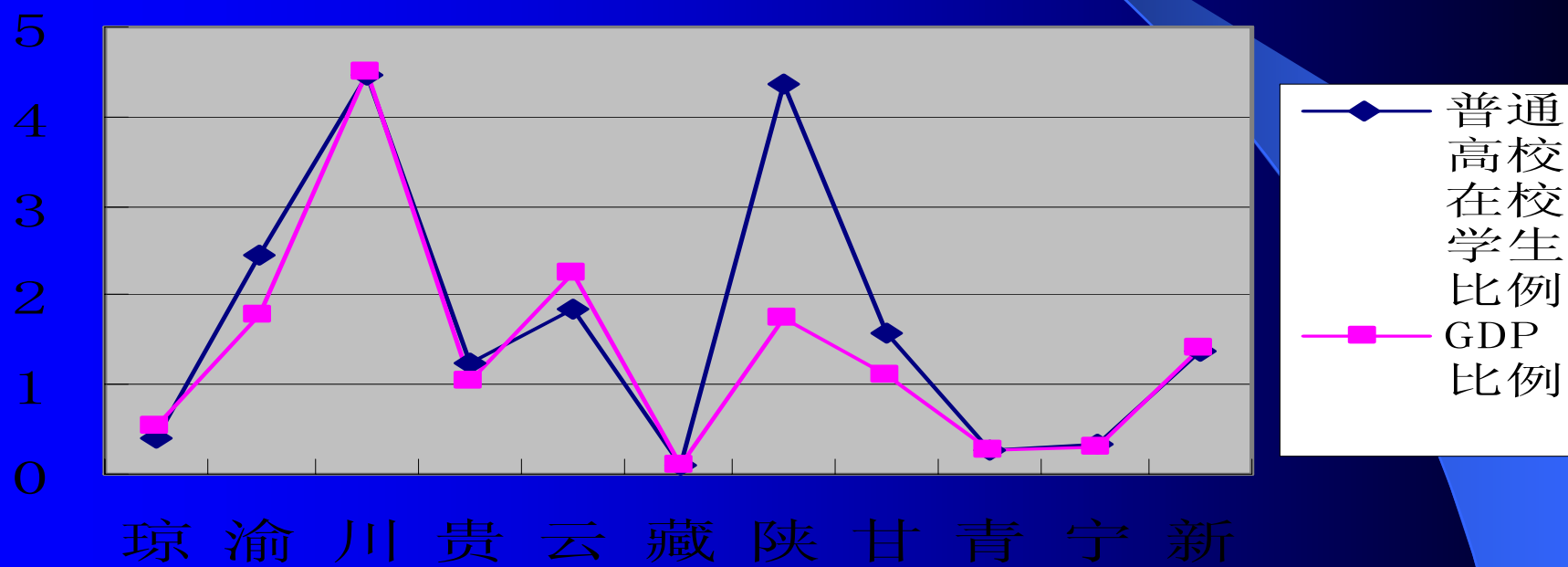
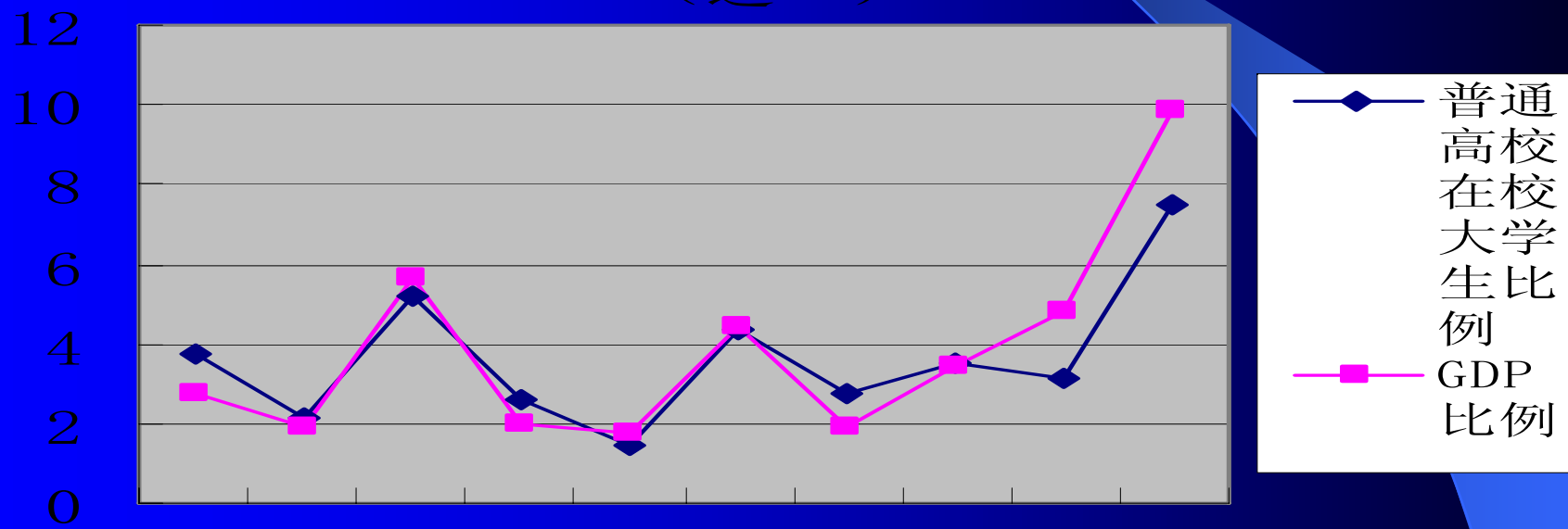




表2：2004年各省在校生比例和GDP比例  
(之一)



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表2：2004年各省在校生比例和GDP比例  
(之二)

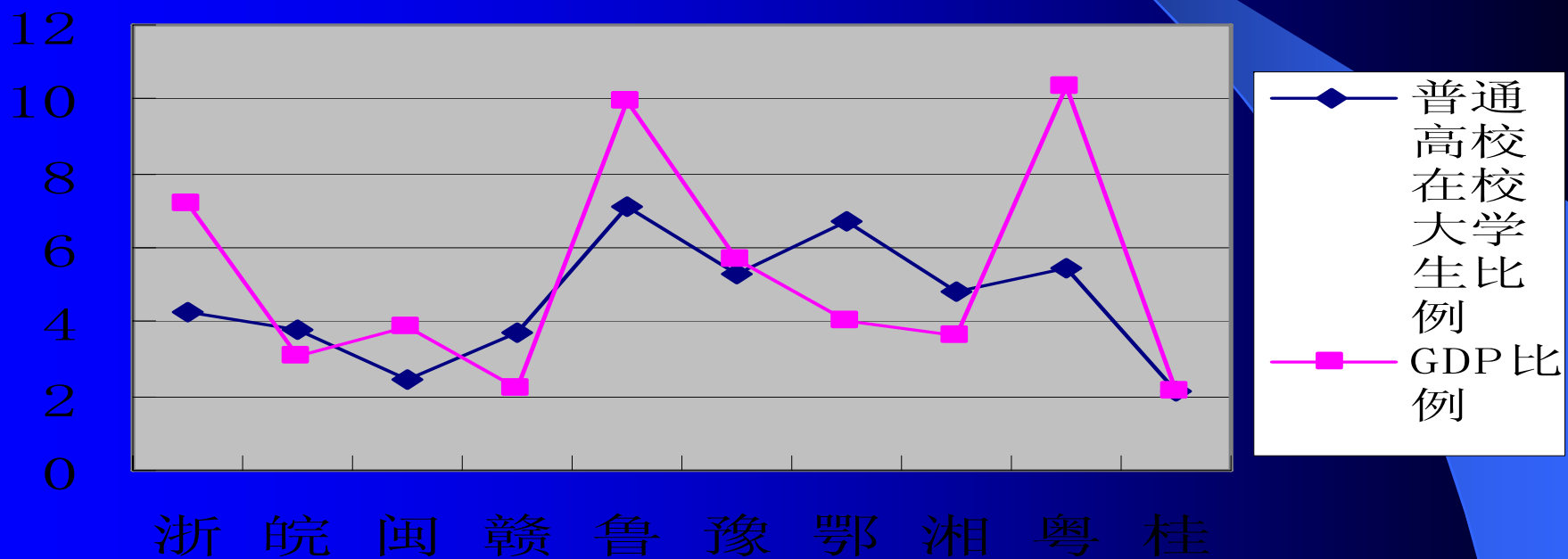
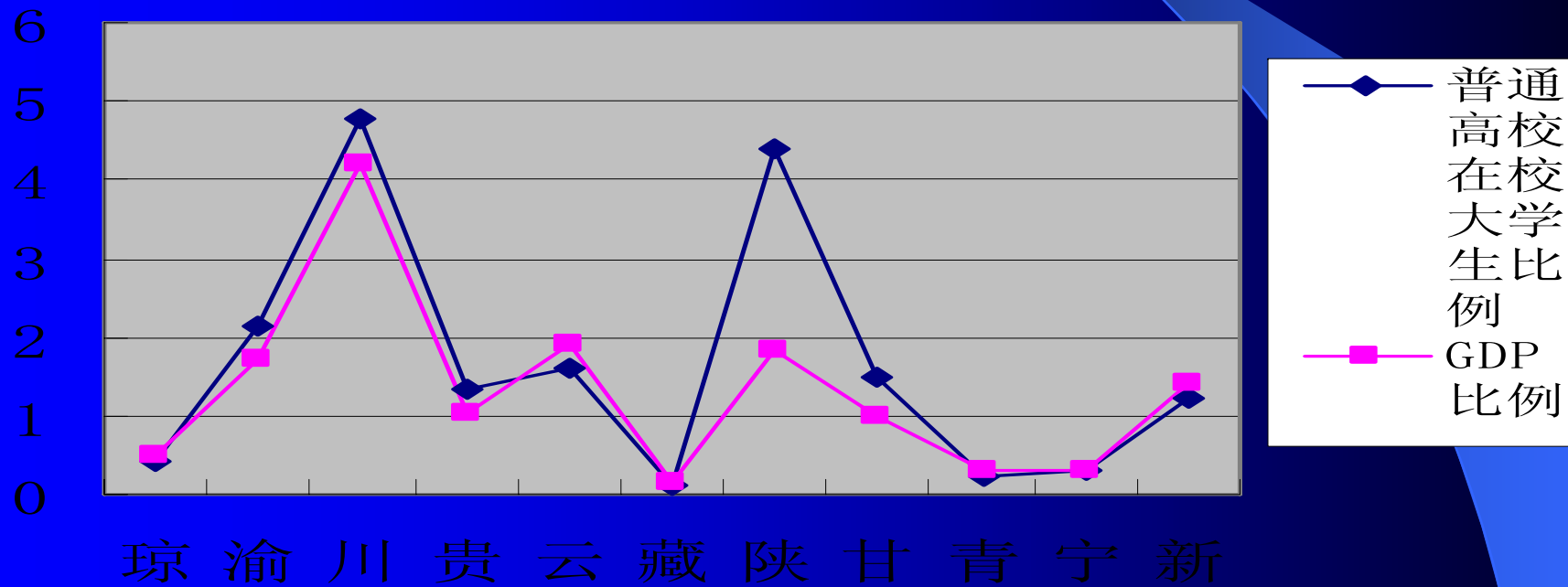


表2：2004年各省在校生比例和GDP比例  
(之三)



- 从上述的变化可以看到，如果说这种比例关系反映了高等教育发展的效率指标，那么，两者之间的相关性则是说明了这种效率的提高。
- From the changes reflected in the above diagraphs, the correlation between economy and student size shows the improvement of efficiency in Chinese higher education



- Second, the balance between the size of population at the age of 18-22, and the size of students.



表3：1998年各省在校生比例和适龄人口比例（之一）

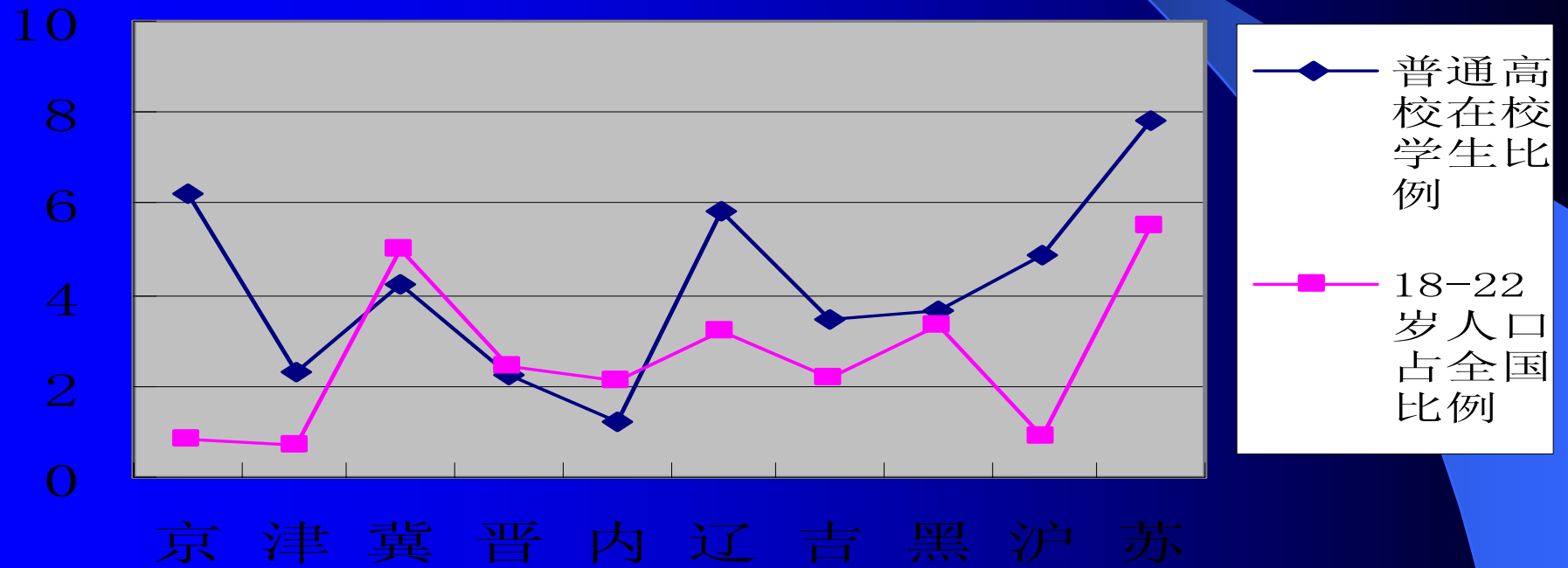


表3：1998年各省在校生比例和适龄人口比例（之二）

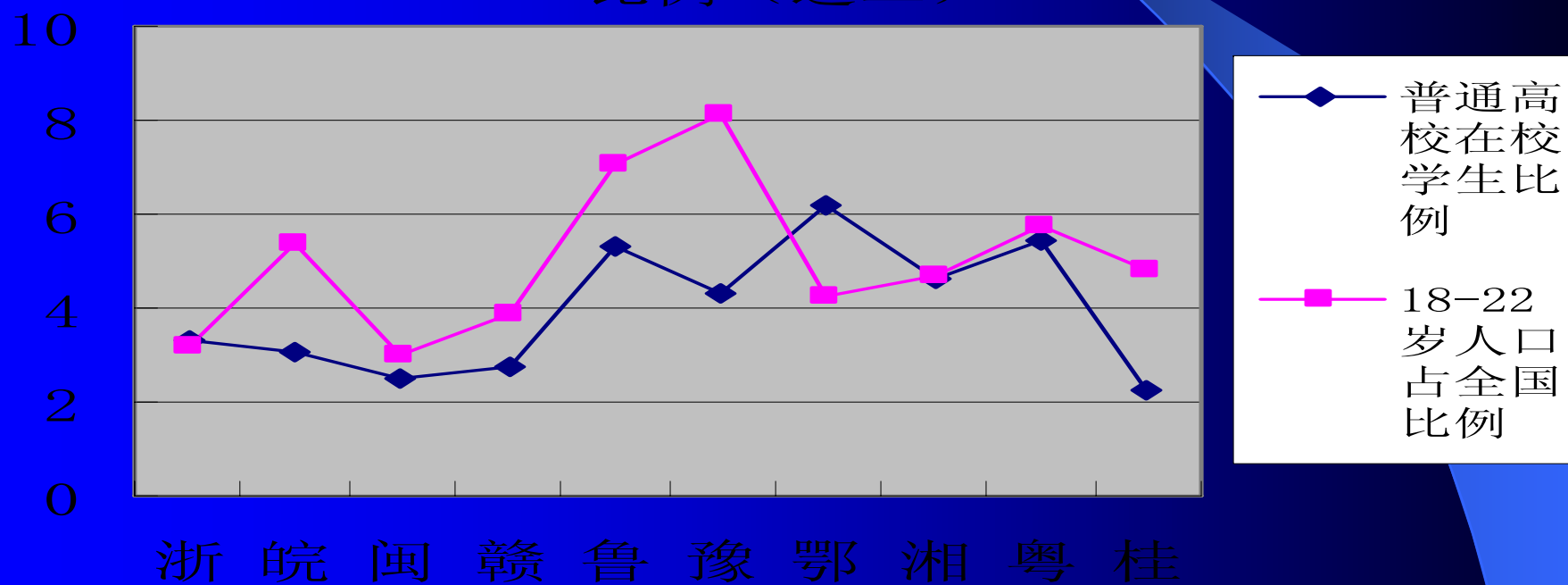


表3：1998年各省在校生比例和适龄人口比例（之三）

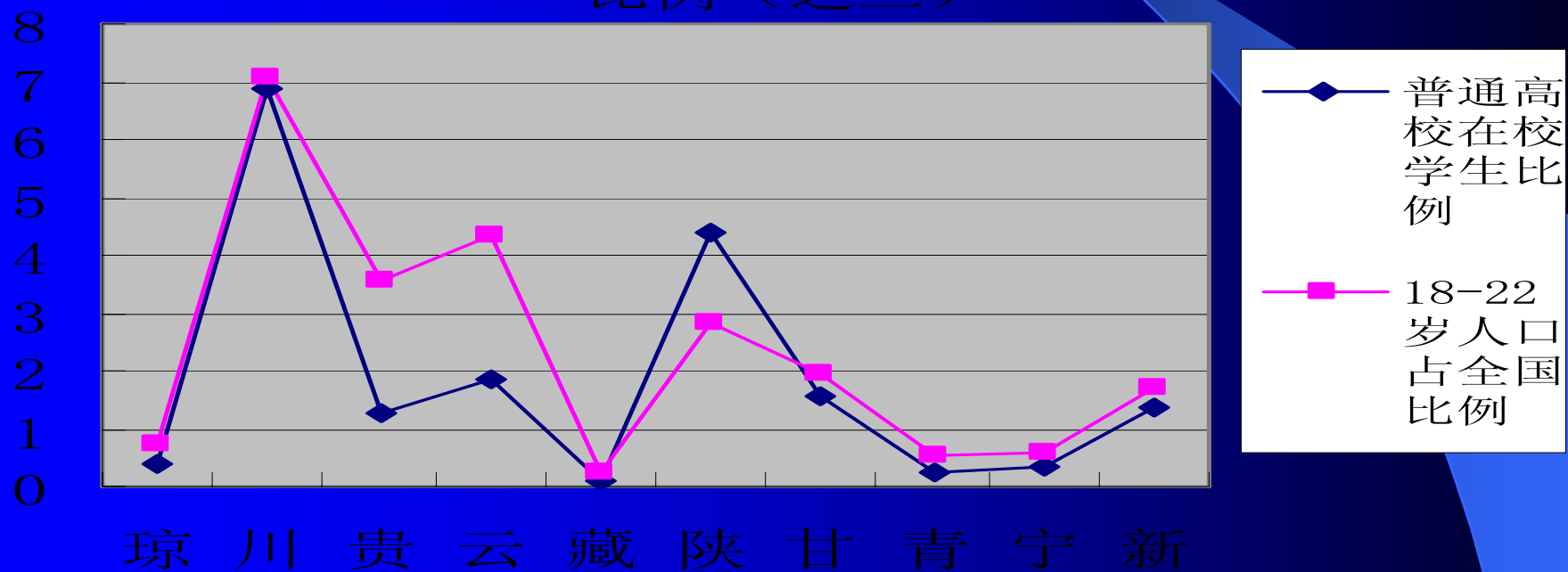




表4：2004年各省在校生比例和适龄人口比例（之一）

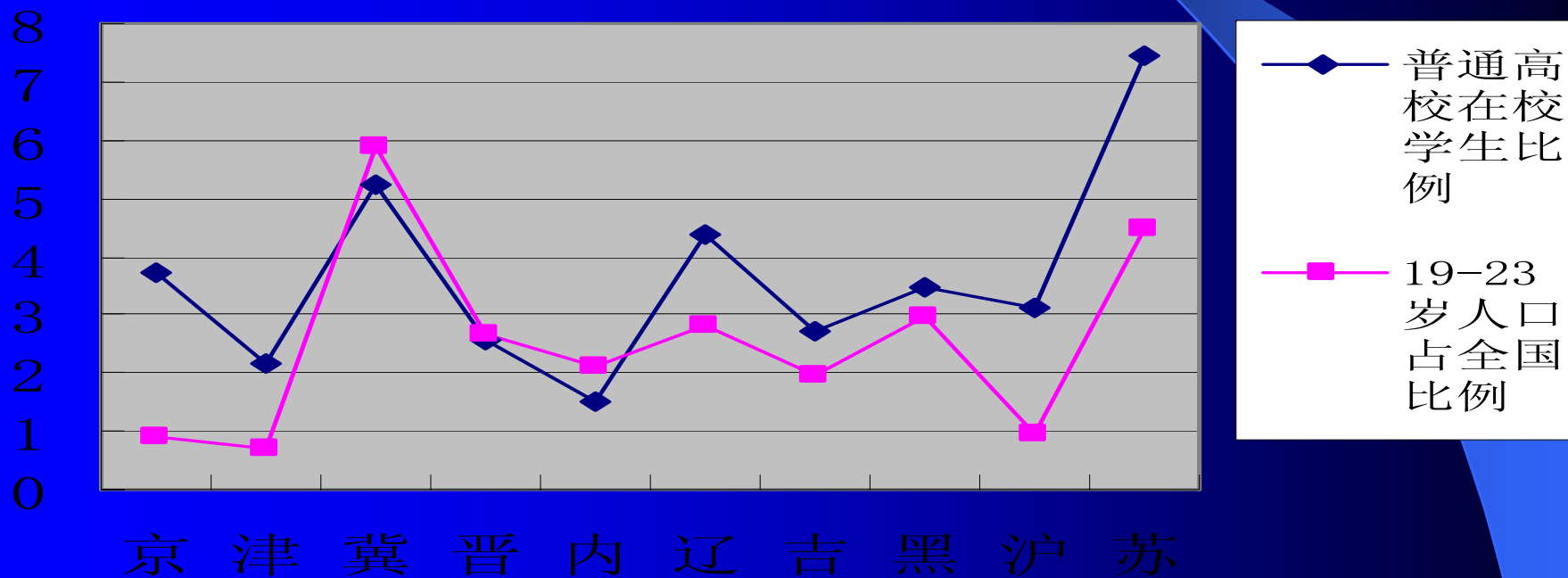


表4：2004年各省在校生比例和适龄人口比例（之二）

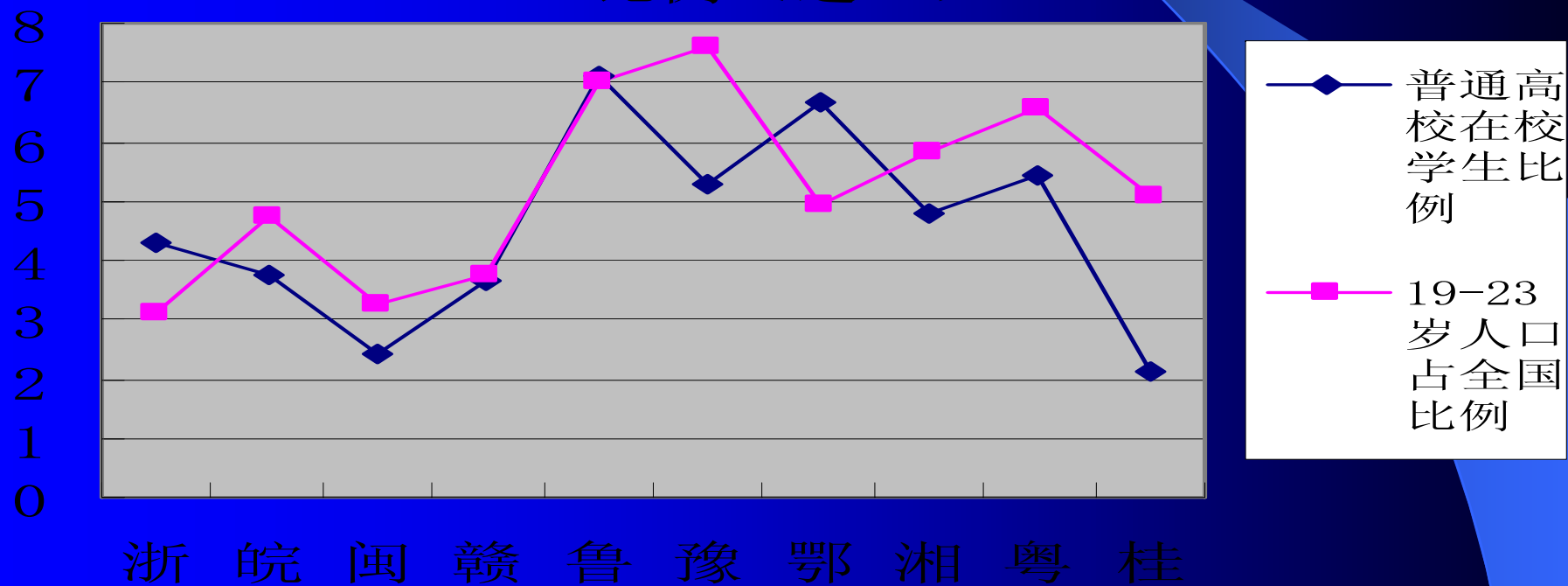
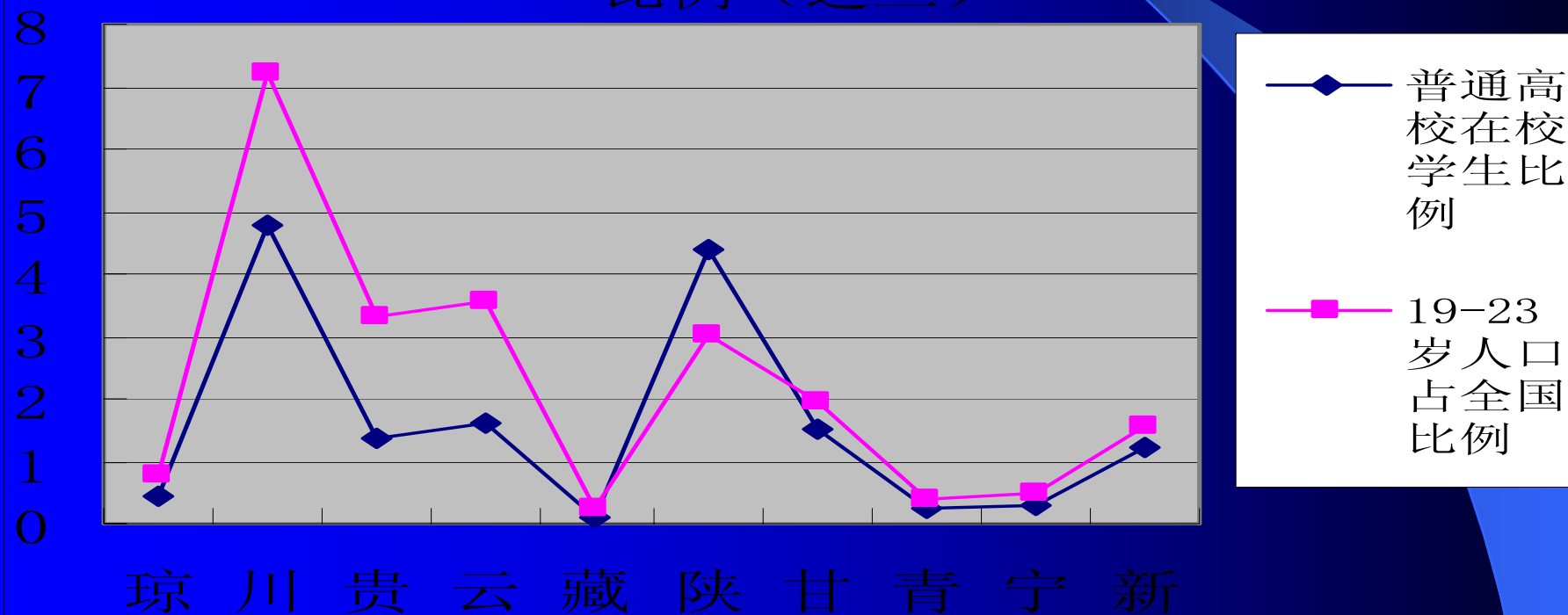


表4：2004年各省在校生比例和适龄人口比例（之三）



- 从这里也可以非常清楚地发现，中国各个不同地方高等教育机会的分布情况已经在大众化的过程中，得到了明显的改善。
- It is very obvious that, following higher education popularization in China, here comes the improvement of the education equity in different regions.



# 1998年与2004年各省在校生规模和适龄人口系数 统计量描述

	系数意义	公平值	均值	标准差	最大值	最小值
B98	1998年在校生数所占比例/ 1998适龄人口数所占比例	1	1.31469	1.5052	0.3493	7.3491
B04	2004年在校生数所占比例/ 2004适龄人口数所占比例	1	1.1493	0.8781	0.4047	4.1729
C98	1998年在校生数所占比例/ 1998适龄人口数所占比例	0	-1E-10	1.9652	-3.8566	5.3979
C04	2004年在校生数所占比例/ 2004适龄人口数所占比例	0	-0.0711	1.5149	-2.9948	2.9817



- 综合以上统计分析，从均值、标准差和最大值和最小值而言，都可以得出**2004**年的教育机会分布的公平性要优于**1998**的结论。
- According to the above data, the equity in higher education in 2004 was better than that of 1998 in terms of mean, standard deviation, minimum and maximum values.



- 显然，这样的结构调整和变化，对于中国高等教育的整体创新提供了一个非常好的基础和保证，但是，在这个过程中，有仍然存在一定的问题，比较突出的问题是，中国的高等教育结构如何进一步适应不同地区社会经济的发展，换句话说，由于中国社会经济整体发展的不平衡，所以，中国高等教育的结构也应该有所分化和差异，包括在学科、层次和不同地区的结构安排上。
- 



- Obviously, the structural adjustment and changes provide a very good foundation and platform for the overall innovation of Chinese higher education. However, there still exist some problems. One noticeable problem is how the structure of higher education adapts to the social and economic development in different regions of China. In other words, due to the unbalanced development of economy in China, the structure of higher education should be, to some extent, made some adjustment to different regional needs. This adjustment including aspects of disciplines, structure and regional features.



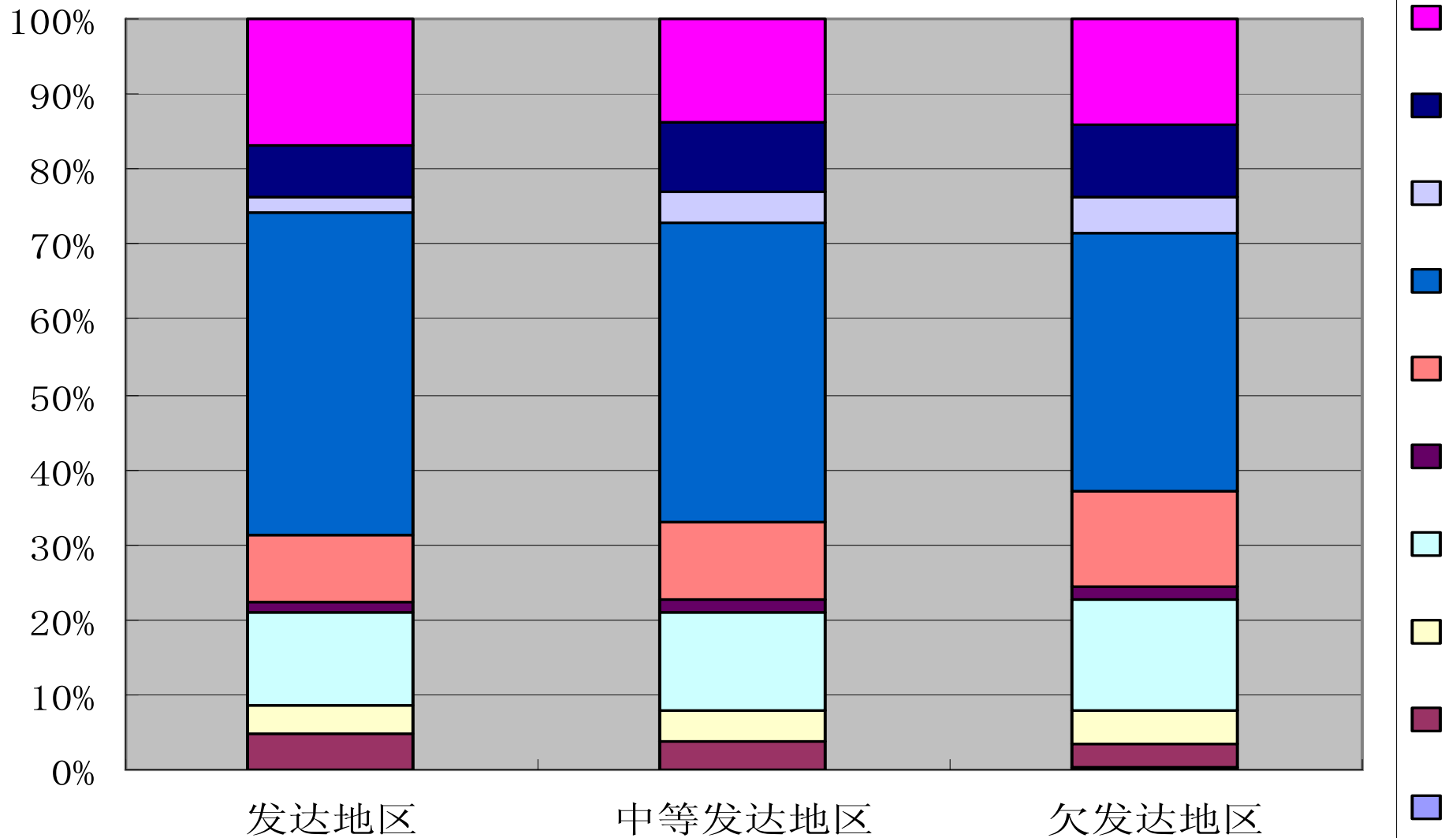


- 目前中国高等教育往往具有一种比较大的趋同性，这种趋同性主要表现在两个方面：一是不同地区高等学校的学科结构，即目前中国在学科分类中的十一个主要学科之间的关系在不同地区具有一定的相似性；

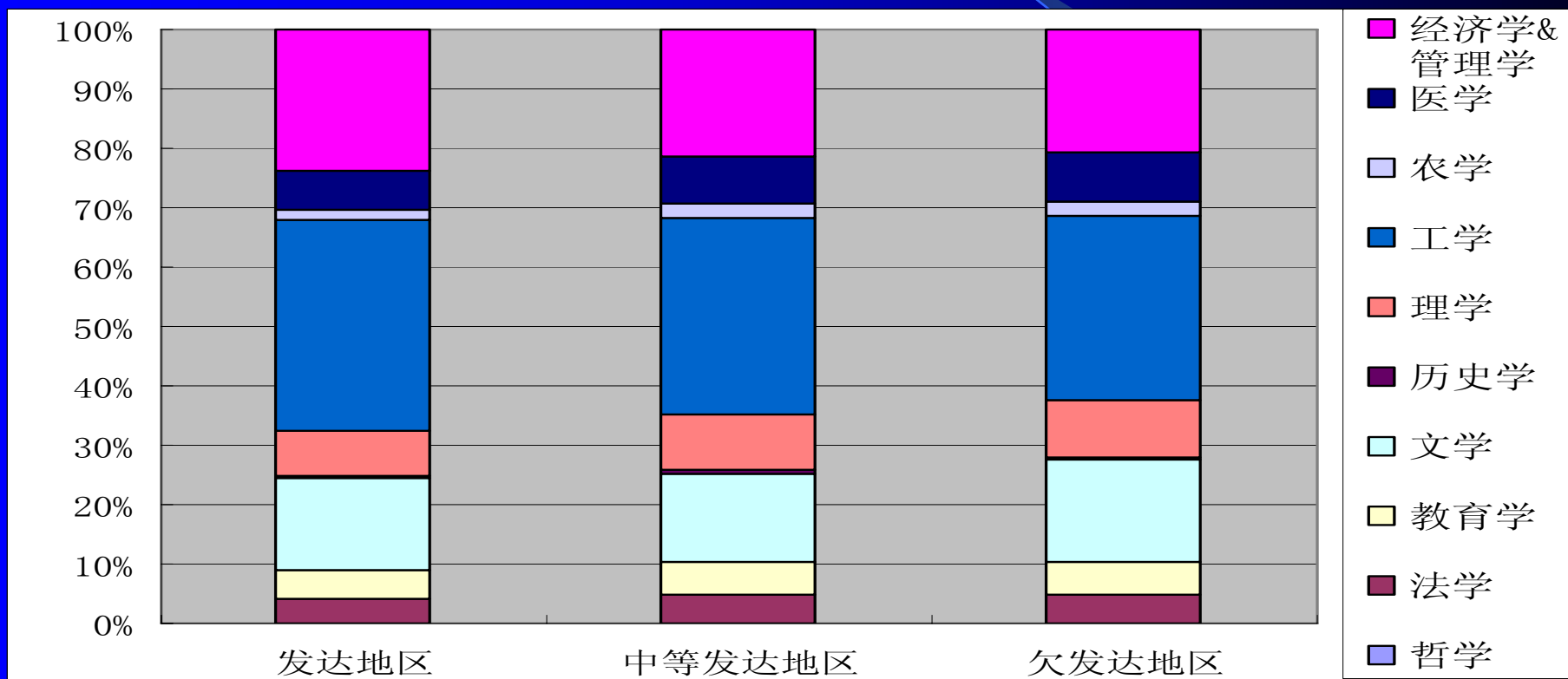
Chinese higher education has a tendency of convergence, which is mainly presented in two aspects: First, the disciplinary structure, relationship between 11 major disciplines under the current classification in universities, has certain similarities.



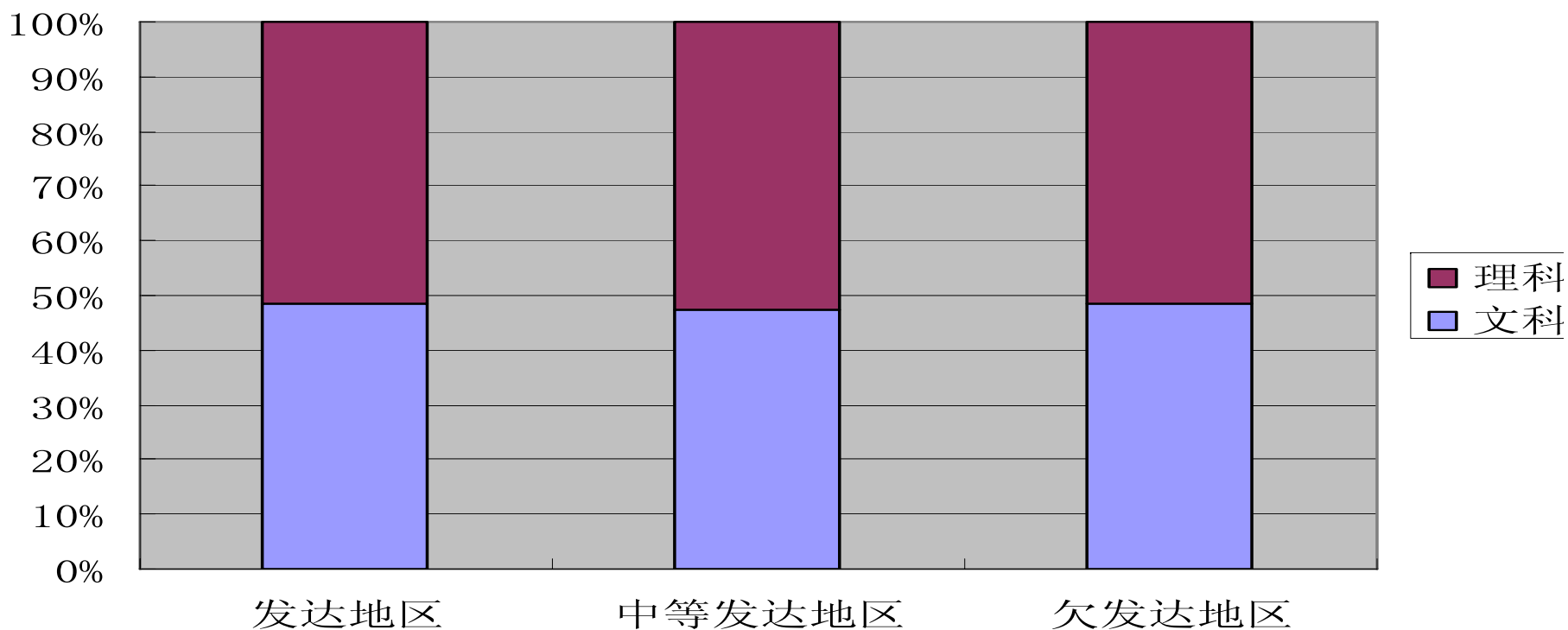
# 图1：1998年发达、中等发达、欠发达地区十大学科门类构成比例



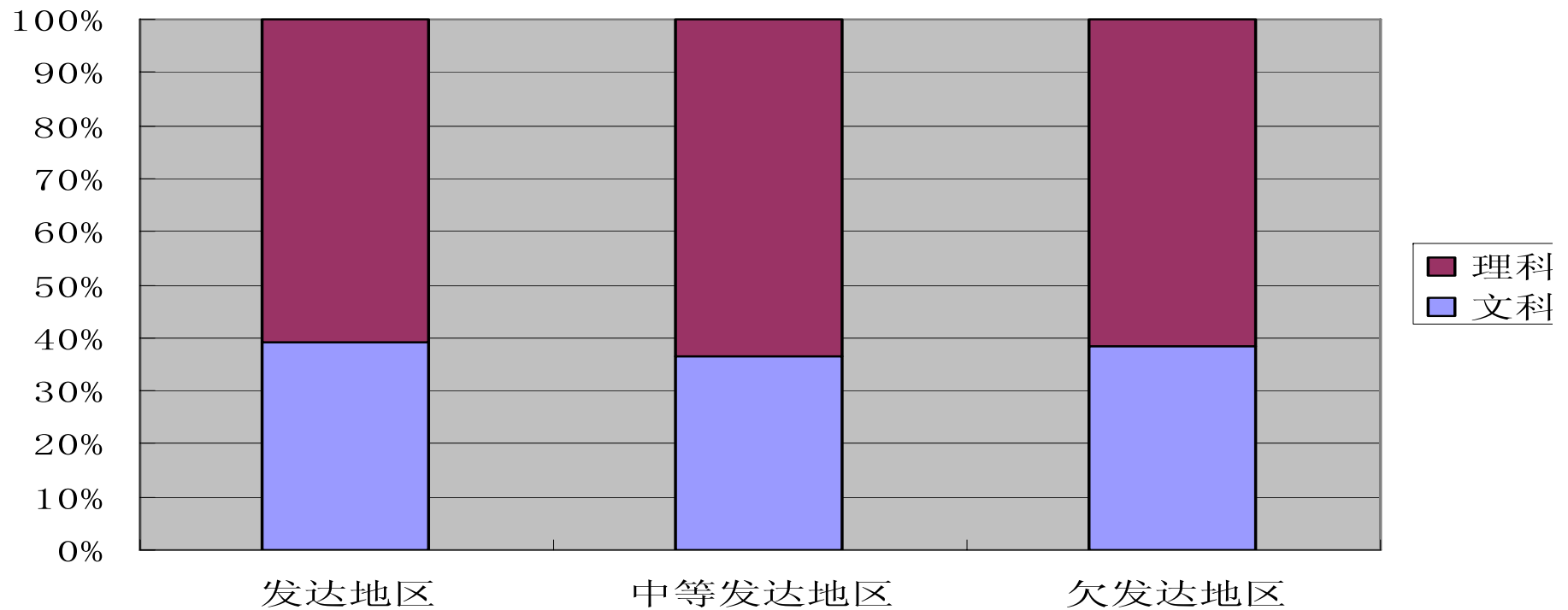
# 图2: 2004年发达、中等发达、欠发达地区十大学科门类比例



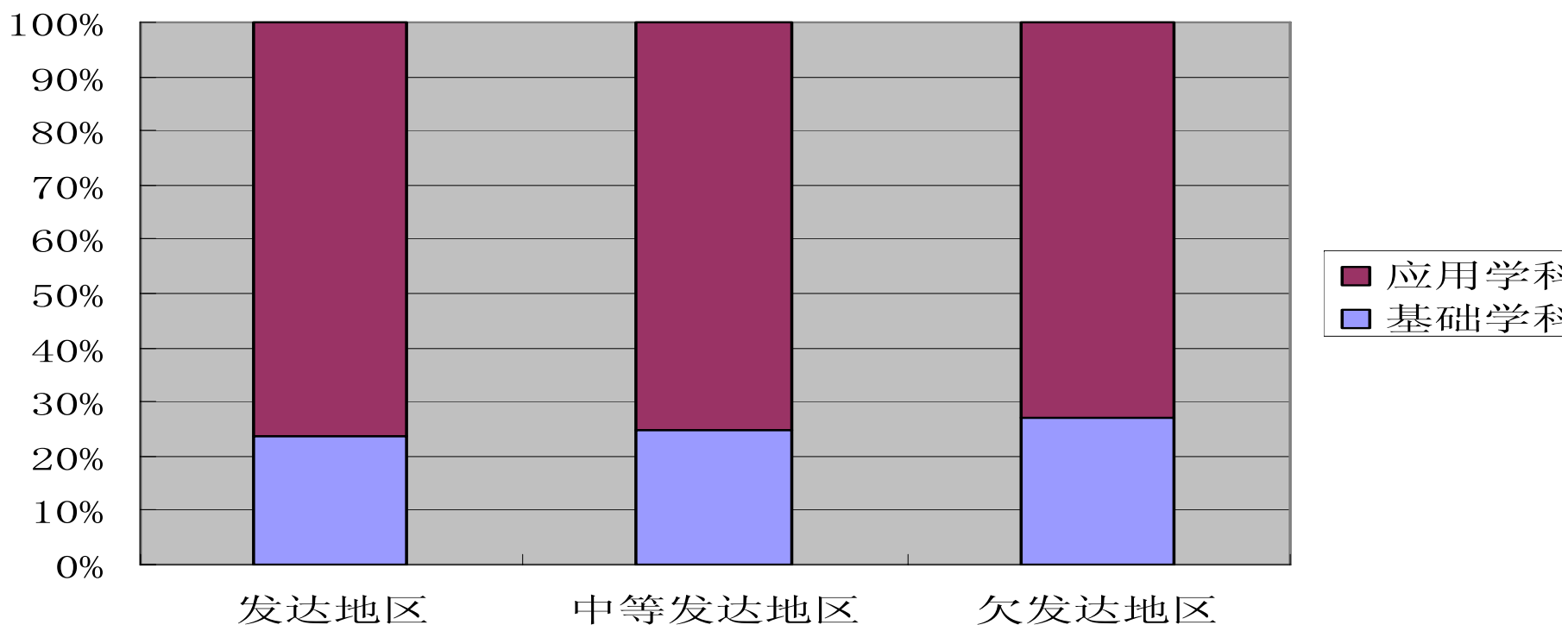
# 图3：1998年发达、中等发达、欠发达地区理科、文科比例



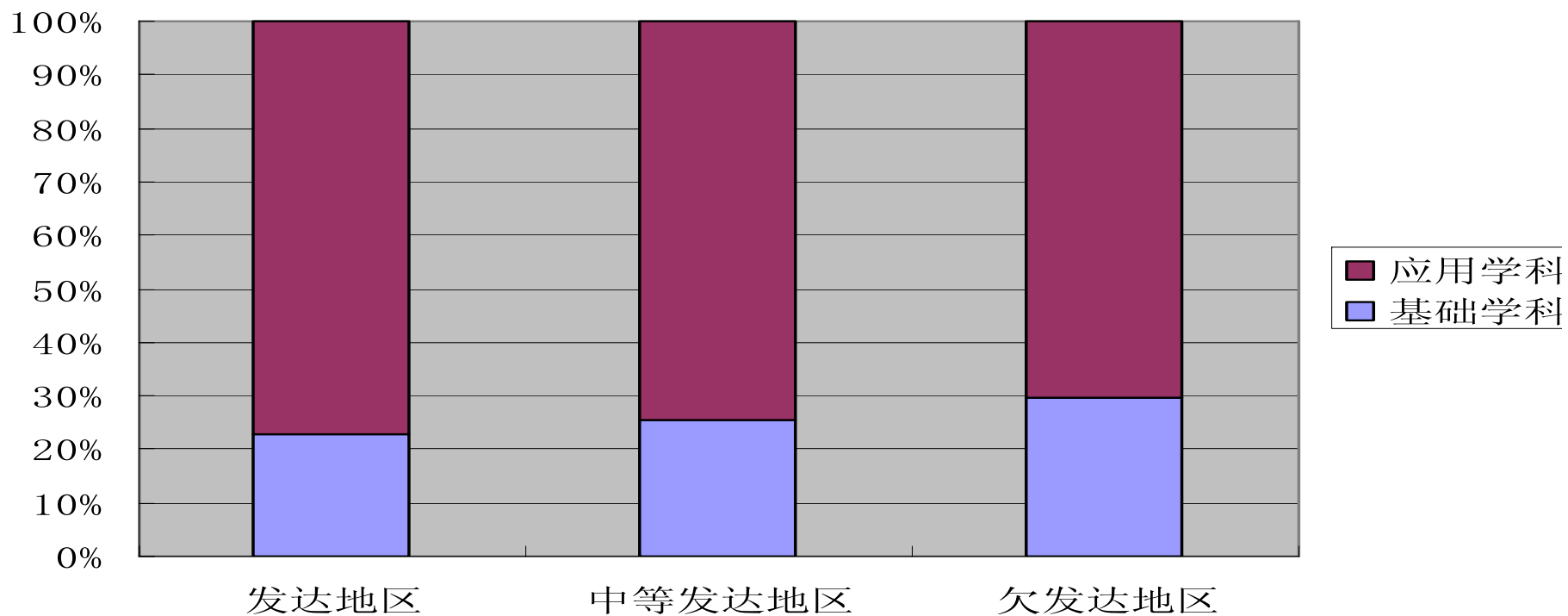
# 图4 2004年发达、中等发达、欠发达地区文科、理科比例



# 图5：1998年发达、中等发达、欠发达地区应用、基础学科比例



# 图6 2004年发达、中等发达、欠发达地区应用、基础学科比例



- These similarities reflect that the disciplinary structure of Chinese high education is problematic in some aspects. It does not fit the economic and social differences in different regions of China.



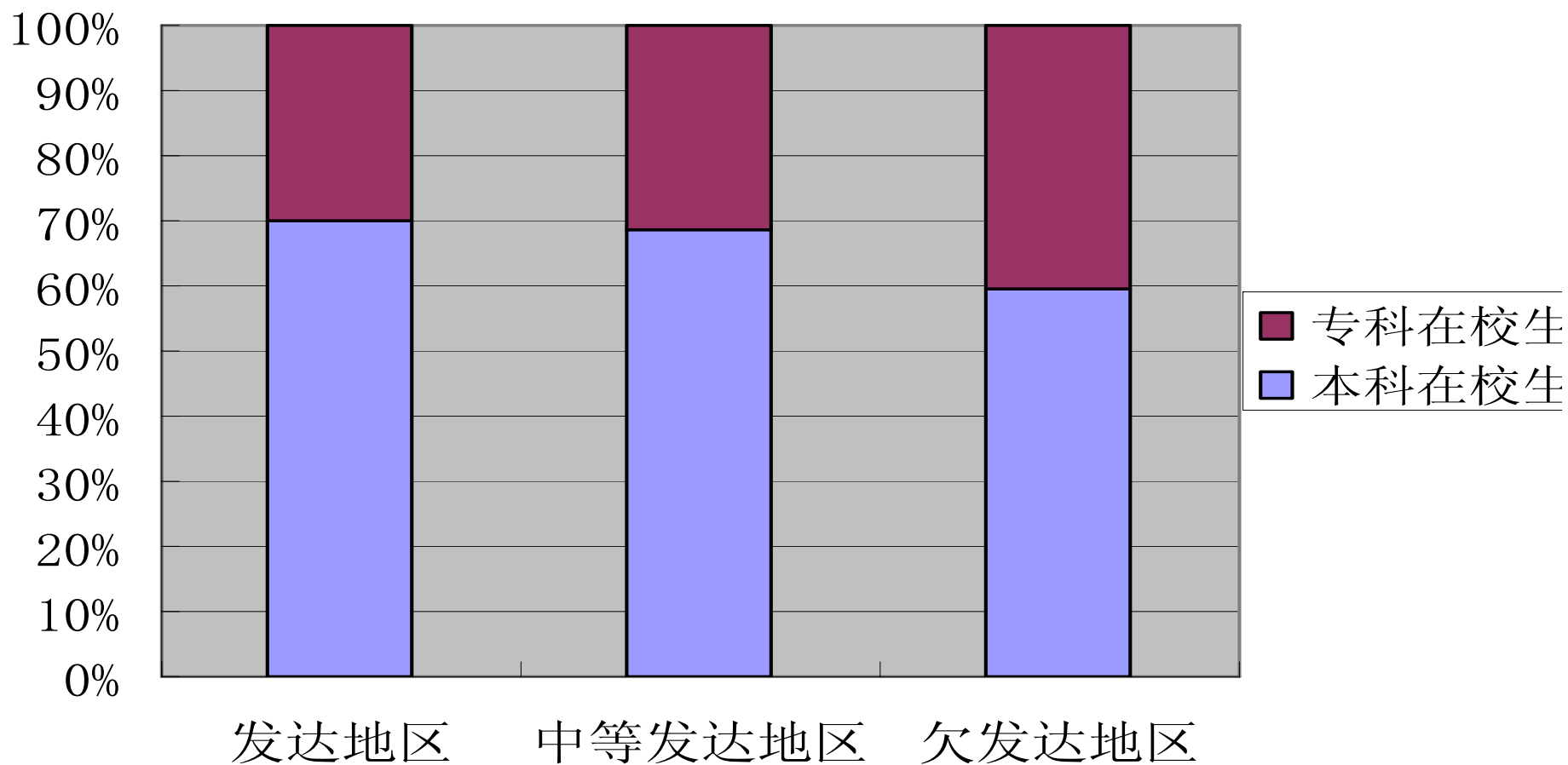


- 第二是层次结构往往都具有一定的趋同性，即本科与专科之间的层次结构在发达地区、中等发达地区和欠发达地区中间的比例关系也呈现出非常一致的局面。显然，这对于高等教育的创新是非常不利的。

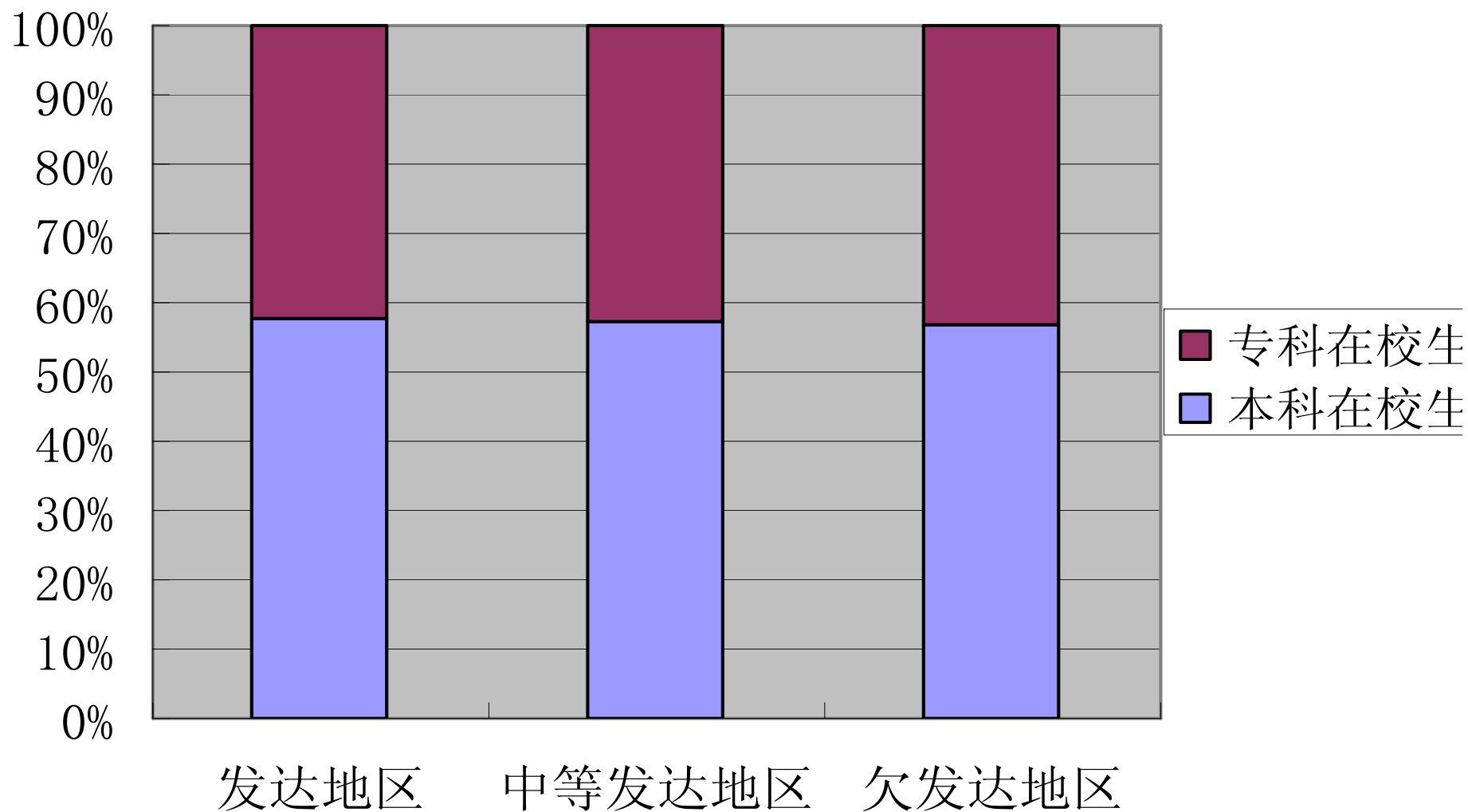
Secondly, structures of universities and community colleges in the developed regions, average-developed regions and under-developed regions tend to be convergent. Apparently, this phenomenon is not helpful to the innovation of higher education.



# 图1 1998年不同地区本、专科比例



# 图1 2004年不同地区本、专科比例



- Generally speaking , overall development in China is unbalanced in many aspects such as economy, society, culture. This unbalance requires different disciplinary structures and resource distributions of higher education.



# 皮尔逊相关系数(Pearson correlation coefficient)分析1998

指标	1998年本科专科比例
1998年人均GDP	相关数:0.42046;P:0.0185
1998年第三产业产值比例	相关数:0.60154;P:0.0003
1998第一产业从业人员比例	相关系数:-0.6218;P:0.0002
1998第二产业从业人员比例	相关系数:0.50736;P:0.0036



# 皮尔逊相关系数(Pearson correlation coefficient)分析2004

指标	2004本科专科比例
2004年人均GDP	相关系数:0.13167;P:0.4801
2004第三产业产值比例	相关系数:0.47676;P:0.0067
2004第一产业从业人员比例	相关系数:-0.176;P:0.3435
2004第二产业从业人员比例	相关系数:-0.11349;P:0.5433



# 两个表的内容的分析与比较,

- 与1998年比较, 教育结构与产业结构之间的相关性(correlation)程度有所降低,而且, 这种相关性(P)成为零的可能性有所增大.

Compared to 1998, the correlation between educational structure and industrial structure decreased, moreover, the possibility of the correlation becomes zero increased.



# Conclusion

- In conclusion ,The structural changes in Chinese high education is meaningful, not only to education itself ,but also to the social and economic development. They have following benefits:





- First of all, this structural change is significant for the future development of Chinese higher education. If there is no updating of educational structure in a higher education system, no improvement will be achieved.



- Secondly ,considering on the relationship between educational structure and educational equity, it is obvious that the structure is a very important indicator of educational equity.



- Thirdly, considering the relationship between educational structure and economic and social situations in different parts of China, the changes of educational structure will benefit the overall national development.



- Fourth, the relations between the nature of the structure and some issues in Chinese higher education will be addressed.



- Fifth, comparing the structural changes in China with other countries in the same situation, we find the process of popularization of Chinese higher education accords with the regular pattern.



• Thank you !

