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Work-Related Fatal and Nonfatal Injuries among U.S. Construction Workers, 1992-2008

Contents

Charts

CPWR - The Center for Construction Research and Training has been monitoring construction safety and health to provide a basis for more effectively targeting injury and illness prevention efforts since 1990. This report summarizes work-related deaths and nonfatal injuries and illnesses among construction workers from 1992 through 2008, the most recent year for which data were available.

There were several substantial changes across the study period, including different industrial and occupational classification systems (NAICS), beginning in 2003. Therefore, statistics for a specific occupation may not be directly comparable prior to and after 2002 (*see* Annex). Some construction occupations are not presented individually since small numbers for those occupations would not be statistically reliable. Additionally, detailed information on injuries and illnesses among Hispanic construction workers were reported separately as a Data Brief, which can be found at the CPWR website: www.cpwr.com

Methods

Data on Fatal Injuries

Numbers of deaths were obtained from the Census of Fatal Occupational Injuries (CFOI) conducted by the U.S. Bureau of Labor Statistics (BLS). The CFOI is a federal-state cooperative program that has been implemented in all 50 states and the District of Columbia since 1992 (BLS 2010a). The CFOI data on deaths resulting from injuries are compiled from death certificates, workers' compensation reports, OSHA reports, medical examiner reports, newspaper articles, and other sources. Both the death and the work-relatedness of the death must be corroborated by at least two data sources or one data source and a follow-up questionnaire. States are allowed to revise the reports within one year. Deaths occurring during a commute to or from work are not considered work-related, but vehicle-related deaths during the course of work are included. Except where noted, the calculations of death rates in this report include the public and private sectors and self-employed workers. Thus, the numbers presented here may differ from those in some BLS publications, which include only deaths in the private sector.

From 1992 to 2002, the CFOI data coded the construction industry as 1500 to 1799 by the 1987 Standard Industrial Classification system (SIC; OMB 1987) and "CCCC" for construction sectors that could not be categorized in any SIC. Occupations were coded under the 1990 Census Occupational Classification System. Beginning with the 2003 data, the CFOI has coded the construction industry as 23 and detailed construction sectors as 23600 to 23899 using the North American Industry Classification System (NAICS; OMB 2002). Construction trades and extraction occupations were coded from 47-0000 to 47-5099 under the 2000 Standard Occupational Classification System (www.bls.gov/soc/home.htm).

Data on Nonfatal Injuries and Illnesses

The Survey of Occupational Injuries and Illnesses (SOII) provided cases of nonfatal injuries and illnesses. The SOII is a federal-state program in which employer reports are collected annually from private sector establishments and processed by state agencies cooperating with the BLS. Unlike the CFOI, the SOII measures nonfatal injuries and illnesses for private industries and excludes the self-employed, farms with fewer than 11 employees, private households, and employees in federal government agencies.

In addition to adopting the new industrial and occupational coding systems, the SOII has undergone several important changes in recent years, including changes in OSHA recording requirements (OSHA 2002), which may affect the data comparability across years. Since illnesses account for less than 3% of nonfatal cases in construction, this report occasionally refers to just the broad category of “injuries.”

Aging workforce. Following the trend of the aging workforce in the United States, construction workers are also growing older. In 2009, the average age of construction workers was 41 years, almost four years older than that in 1992 (chart 4), with the median age increasing from 36 to 41 during this period

Nonfatal injuries among construction occupations. In 2008, construction laborers had the largest number (n = 27,150) of DAFW cases among all construction occupations (chart 15a), while sheet metal workers had the highest rate of such cases (506.7 per 10,000 FTEs) (chart 15b). In addition, insulators, ironworkers, and roofers had higher nonfatal rates than the average.

Trends among selected construction occupations, 1992 – 2008

Bricklayers: Overall, fatal and nonfatal injury rates for this occupation were lower than those for all of construction (charts 16a, 16b). Falls to a lower level remained the leading cause of death for bricklayers (142 deaths, 51% of 276 deaths).

Carpenters: This group had lower death rates than for all construction (chart 17a). Falls to a lower level were the leading cause of death for carpenters (838 deaths, 54% of 1,546 deaths), followed by being "struck by" an object, (147 deaths, 9%). Nonfatal injury rates for carpenters were slightly higher prior to 2006, but very similar to all construction in recent years (chart 17b).

Construction laborers: The death rate for this occupation was consistently higher than for all construction (chart 18a). Falls to a lower level were the leading cause of death for this group (1,361 deaths, 28% of 4,928 deaths), followed by being struck by a vehicle (701 deaths, 14%) and being struck by an object (592 deaths, 12%). The nonfatal injury rate decreased substantially by 82% with 1,330 injuries per 10,000 FTEs in 1992 to a mere 234 per 10,000 FTEs in 2008 (chart 18b). Still, in 2008, construction laborers suffered a higher nonfatal rate than all construction workers combined.

Electrical power-line installers: The death rates were consistently higher for this group than all of construction, but dropped substantially by almost 50% between 1992 and 2008 (chart 19a). Contact with electric current was the leading cause of death at 136 (52% of 260 deaths) for the past 17 years, followed by falls to a lower level at 74 (28%). The nonfatal rate constantly fluctuated over the years but, like the death rate, went down nearly 20% during this time period (chart 19b).

Electricians: The death rate rose and fell over the years but notably decreased by 56% from 1992 to 2008 (chart 20a). The major cause of death for electricians was contact with electric current (596 deaths, 52% of deaths), followed by falls to a lower level (128 deaths, 17%). The nonfatal injury trend for this occupation was similar to the trend for all construction, but the rate was slightly lower than the entire construction industry, declining from 496 to 156 per 10,000 FTEs in 1992 - 2008 (chart 20b).

Excavating/loading machine operators: The death rate varied over the years for this group and was higher than all of construction for most years (chart 21a). Being struck by an object was the leading cause of death for this occupation (26 of 204 deaths). Throughout the time period, the nonfatal rate was lower than for all construction, except for 2008 (chart 21b).

Ironworkers: The death rate for this occupation was significantly higher than all construction, but declined gradually by 68% over the years (chart 22a). Falls to a lower level caused 453 deaths (68% of 666). The nonfatal injury rate for ironworkers decreased from 1992 to 2008 by 85%, from 1,750 to 256 per 10,000 FTEs. Despite this decline, the nonfatal injury rate still remained higher than the entire construction industry (chart 22b).

Operating engineers: The death rate for this group varied over the years, but was generally higher than that for all construction (chart 23a). Being struck by an object was the leading cause of death for operating engineers, who operate and maintain heavy equipment (112 of 684 deaths, 16%). The nonfatal injury rate was lower than all construction during the study period, except for 1992 (chart 23b).

Painters: Fatal and nonfatal injury rates for this occupation were lower than for all construction. The death rate decreased by nearly 20% and the nonfatal injury rate dropped 76% from 368 to 90 per 10,000 FTEs between 1992 and 2008 (charts 24a, 24b). Falls to a lower level caused 401 deaths (57% of deaths).

Plumbers: The death rate was consistently low and decreased during this period (chart 25a). Falls to a lower level were the major cause of death (92 of 520 deaths, 18%). The trend of nonfatal injury rates was similar to all construction, and decreased by 56% from 504 to 220 per 10,000 FTEs in 1992 - 2008 (chart 25b).

Roofers: Rates of death from injuries were consistently higher for this group than for all construction (chart 26a). Falls to a lower level caused 810 deaths in 1992 - 2008, which was 75% of all deaths among roofers during this period. Similar to the trend for all construction, the nonfatal injury rate for roofers decreased to 209.4 per 10,000 FTEs in 2008, but was still higher than that the rate (174.3 per 10,000 FTEs) for all construction (chart 26b).

Truck drivers: From 1992 to 2008, the rates of death from injuries fluctuated but were consistently higher than for the construction industry as a whole (chart 27a). Half of the deaths (417 of 796 deaths) were caused by highway accidents. The nonfatal injury rate for this occupation was also higher than all construction in general, but decreased by 49% from 533 to 274 per 10,000 FTEs during the study period (chart 27b).

Welders/cutters: The death rate was constantly higher for this group than for all construction, and increased by 18% from 22 to 26 per 100,000 FTEs in 1992 - 2008 (chart 28a). Falls to a lower level caused 143 deaths (35% of 403 deaths). The nonfatal injury rate fluctuated over the years with a final rate of 150 per 10,000 FTEs in 2008, which was close to the total construction average (chart 28b).

Discussion and Recommendations

The construction industry continues to face serious challenges in safety and health despite the declining rates over time and the significant drop in injuries during the current economic downturn. While overall rates of fatal injuries declined in construction, the rate of fatal falls remained high, especially among several occupations including ironworkers, roofers, welders, and construction laborers. Falls, particularly falls to a lower level, were still the leading cause of death, responsible for about one-third of all deaths in construction. Although during the study period the death rates for ironworker and electrical power-line installer declined by 68% and 50%, respectively, they still ranked as the highest risk occupations. Also, death rates were more than double, or at least 50% higher, for construction laborers, truck drivers, welders, and operating engineers compared with construction as a whole. Training and proven interventions should be adopted for these high-risk construction occupations and activities involving the risk of falls.

This report documented that the construction workforce is continually aging, which is reflected in the age shift for both fatal and nonfatal injures during the study period. Risk variations were observed among different age groups. Construction workers aged 55 years and older had a higher risk of fatal falls. Given the increasing aging workforce in the construction industry, job redesign for older construction workers should be considered and fall protections for them should be enhanced. Younger workers were more likely to suffer from nonfatal injuries, and the risk of fatal falls was higher for younger workers under 20 years old. Age factor should be definitely taken into account when developing training and intervention programs.

Meanwhile, small construction establishments w

underreporting and underestimation, the numbers presented in this report should be interpreted and used with caution.

This report highlights the prominent difference between fatal and nonfatal injury trends in construction, especially for small establishments. While risk factors for fatal and nonfatal injuries are not necessarily the same, the difference might be explained by several factors, including possible underreporting in nonfatal injuries and illnesses. The results from the SOII data are inconsistent with findings from other data sources that show a consistent negative correlation between establishment size and injury rate (McVittie et al. 1997; McVittie 2003; CPWR 2008, chart 33b; Dong et al. 2010). Studies have suggested that lower injury rates in small establishments do not have any explanation other than underreporting in the SOII (Oleinick et al. 1995; Morse et al. 2004). The SOII estimates the number and frequency of occupational injuries and illnesses based on logs kept by private sector employers. The accuracy of the logs depends largely on employers' understanding of which cases are work-related and on the accuracy of recording and reporting. Another factor may be that underreporting is motivated in part by employers' desire to avoid increases in workers' compensation premiums linked to reported injuries (*see* CPWR 2008, page 32; Leigh et al. 2004). Also, the SOII excludes self-employed workers, which is a significant limitation for counting injuries and illnesses in the construction industry since one-fourth of construction workers are self-employed. It is recommended that the BLS collect nonfatal injury and illness data on self-employed construction workers even if it is for selected years; and validate the completeness of reporting, particularly for small construction establishments. Further research should be conducted to examine underreporting issues, explore the relative risks

Glossary

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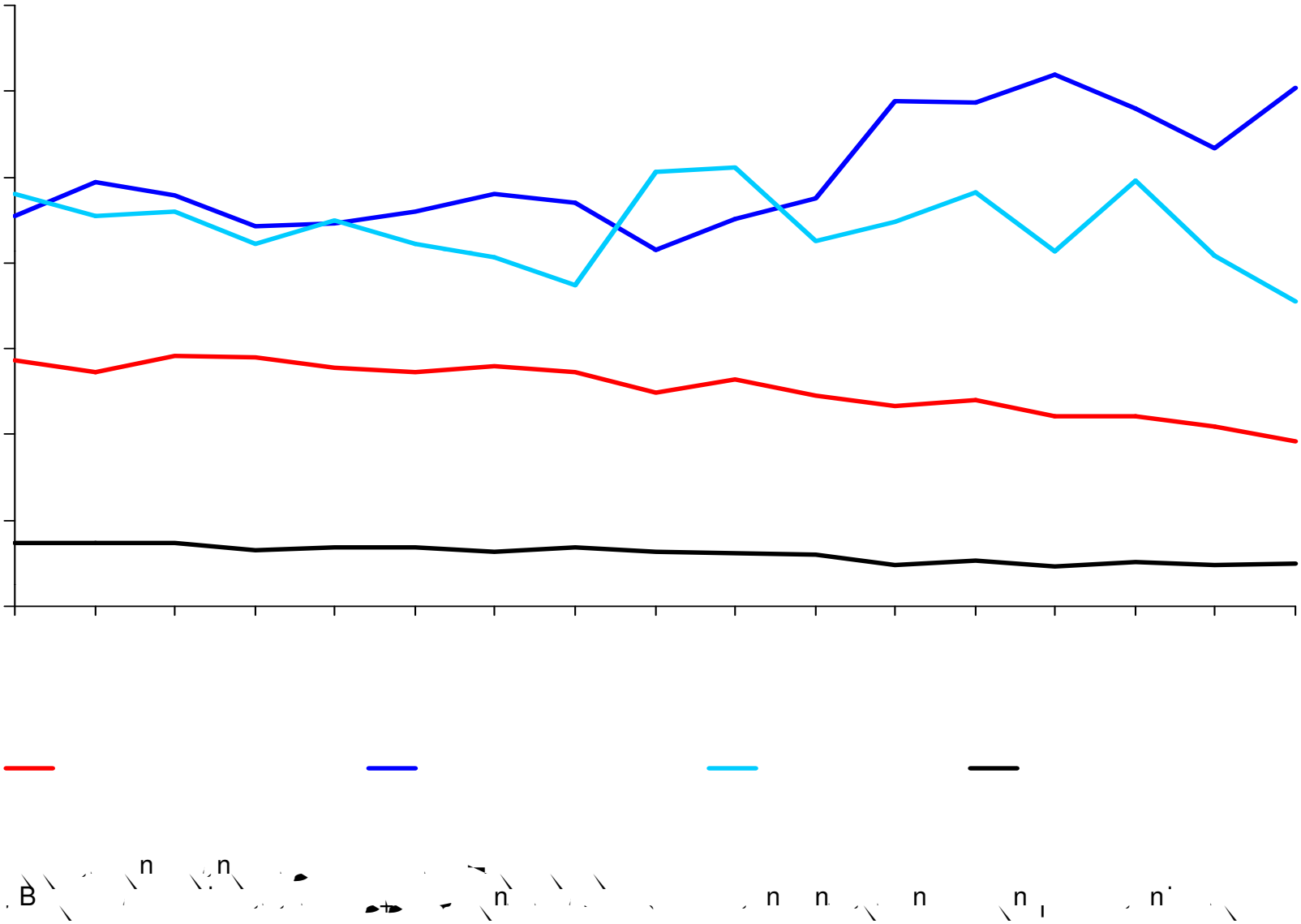
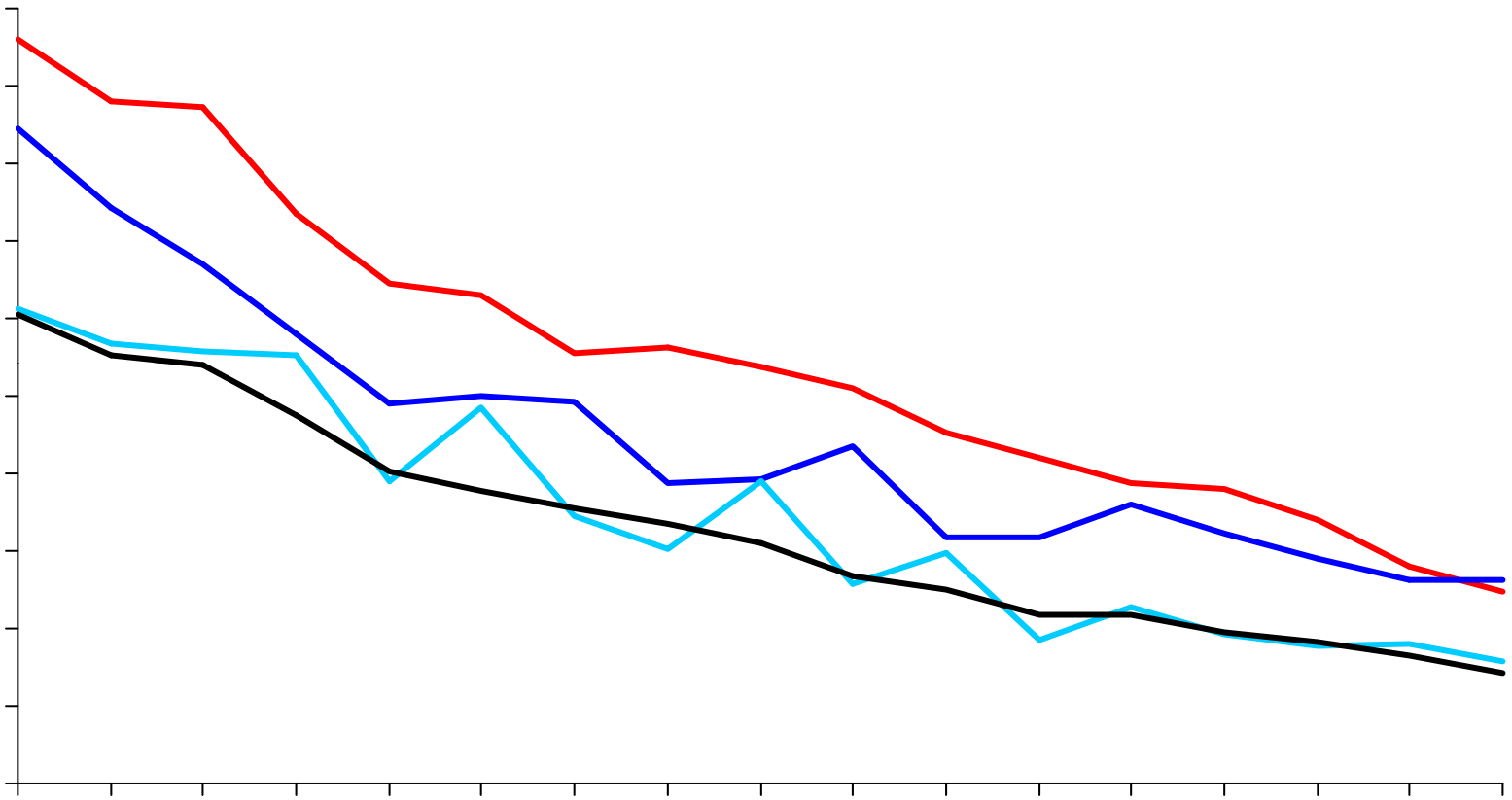
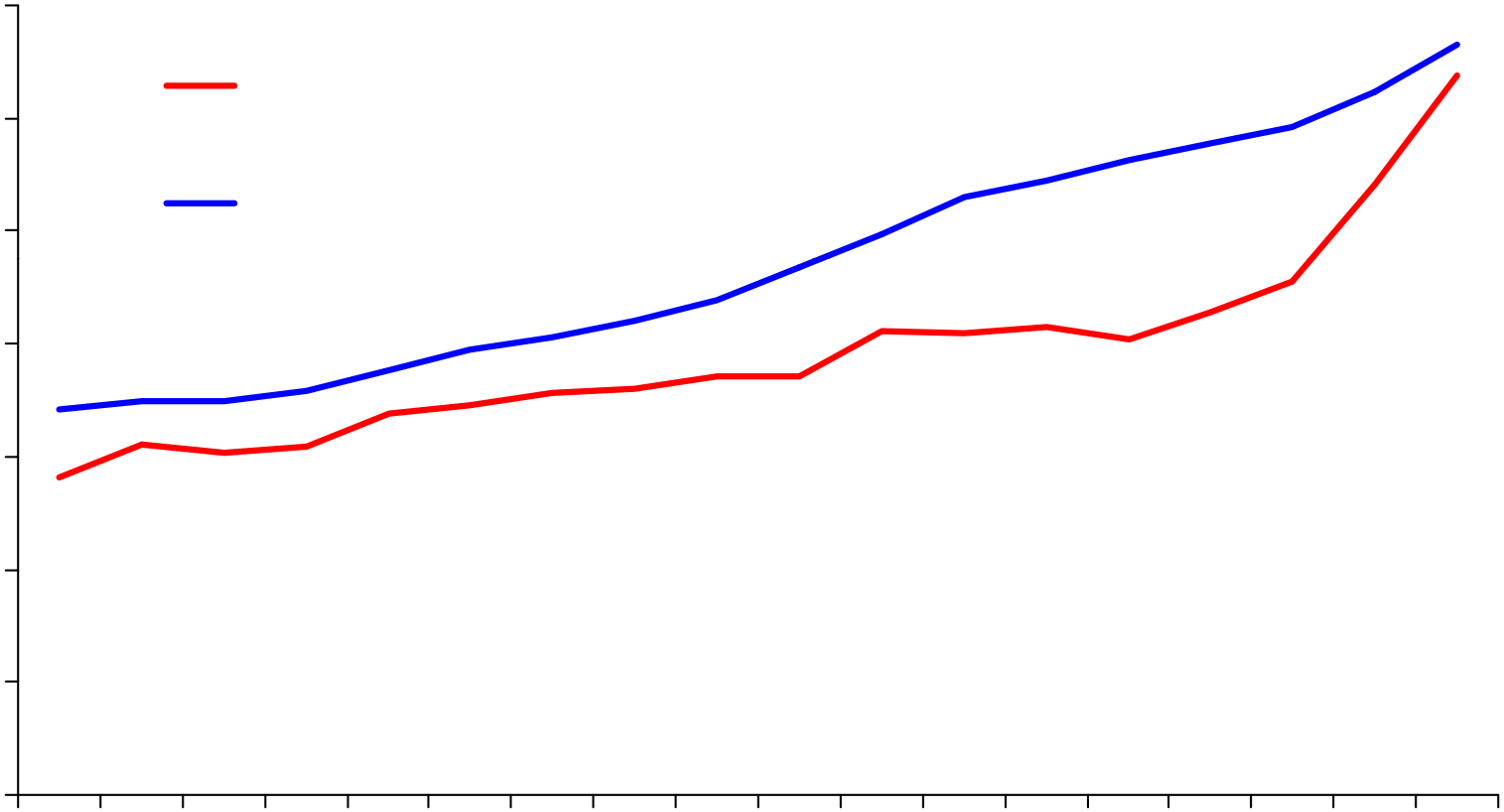
Annex: Comparison between the 1990 Census Occupational Classification and 2000 Standard Occupational Classification for selected occupations

1990 Code	1990 Title	2000 Code	2000 Title
553	Supervisors, brickmasons, stonemasons, tile setters		







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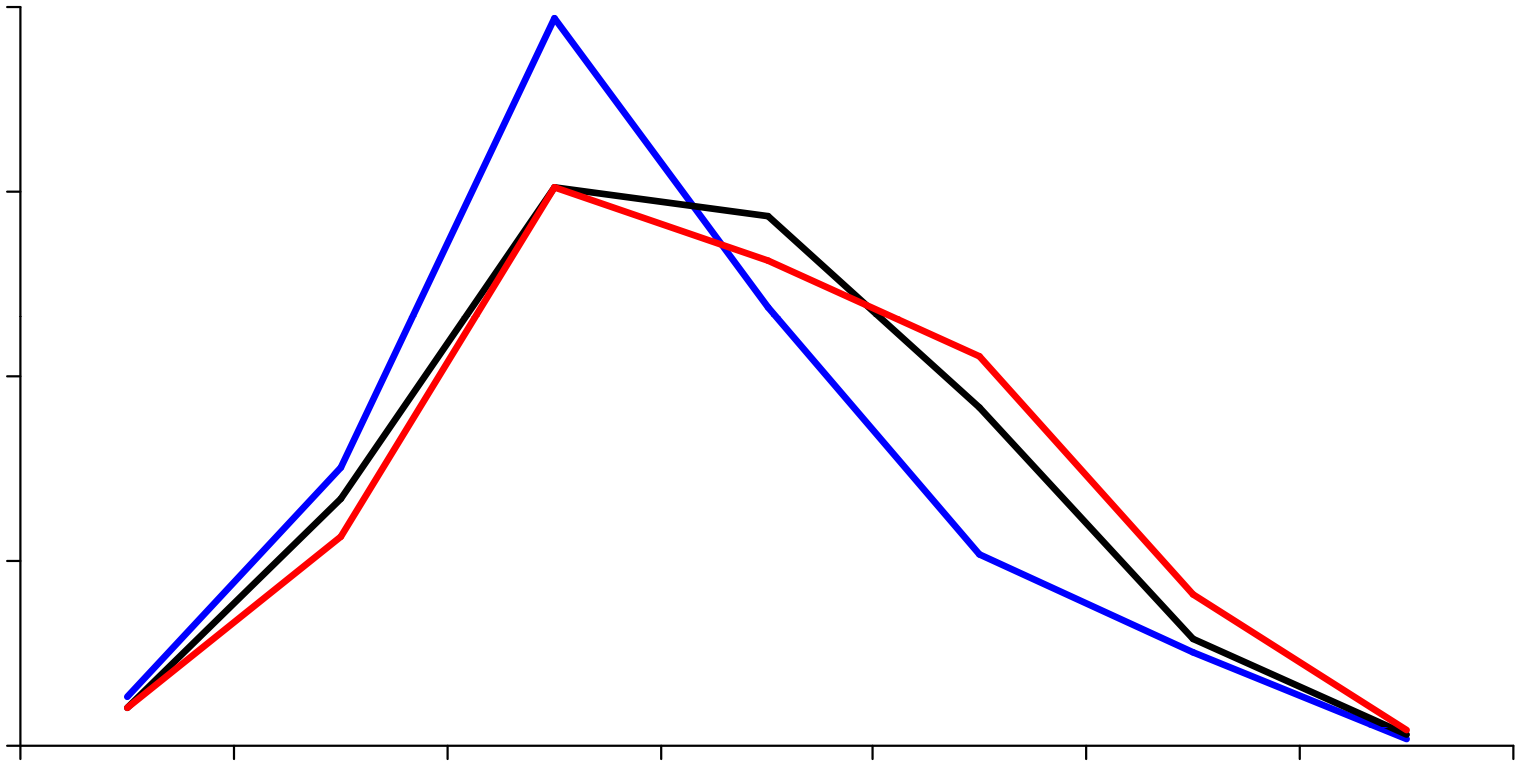

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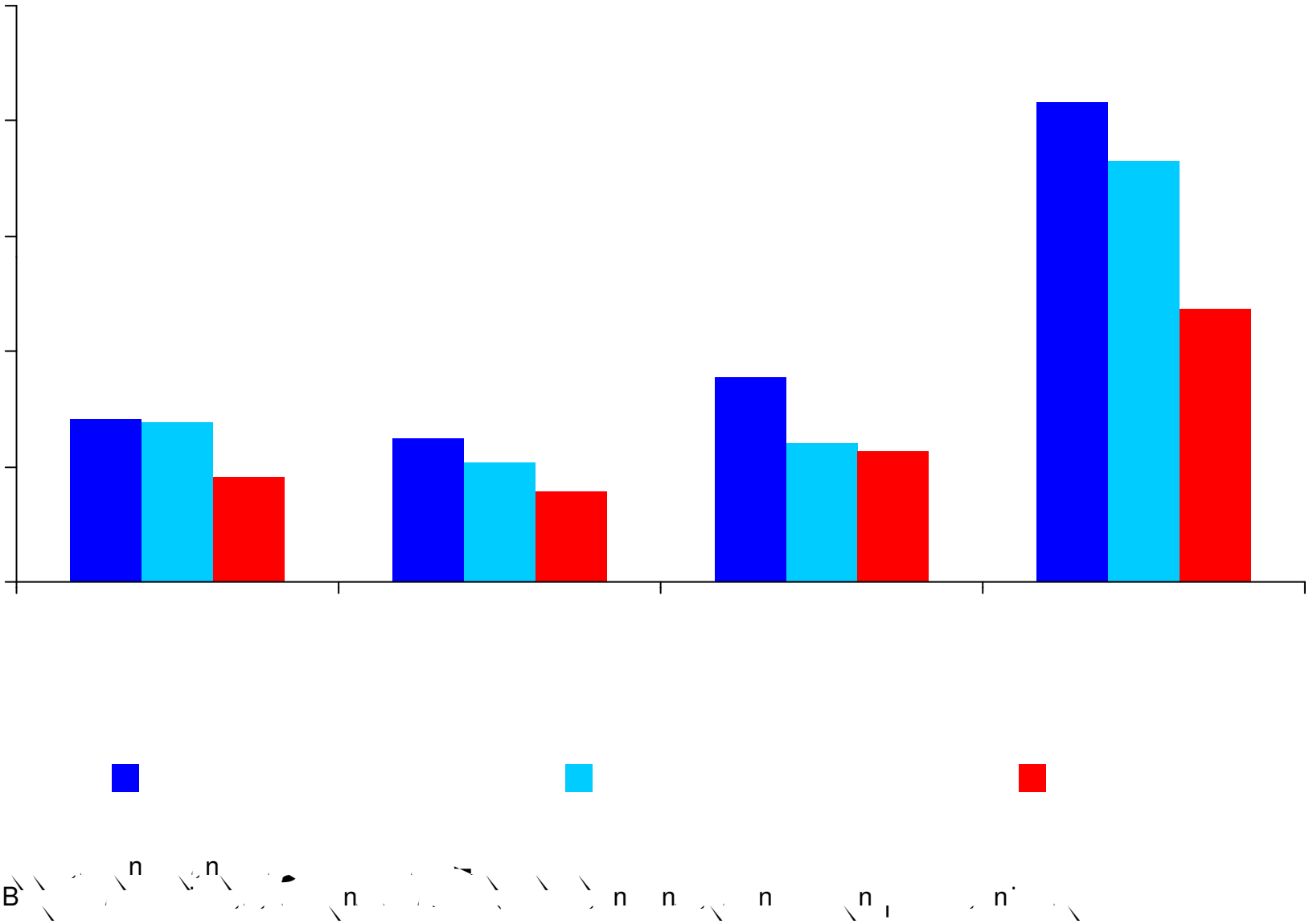

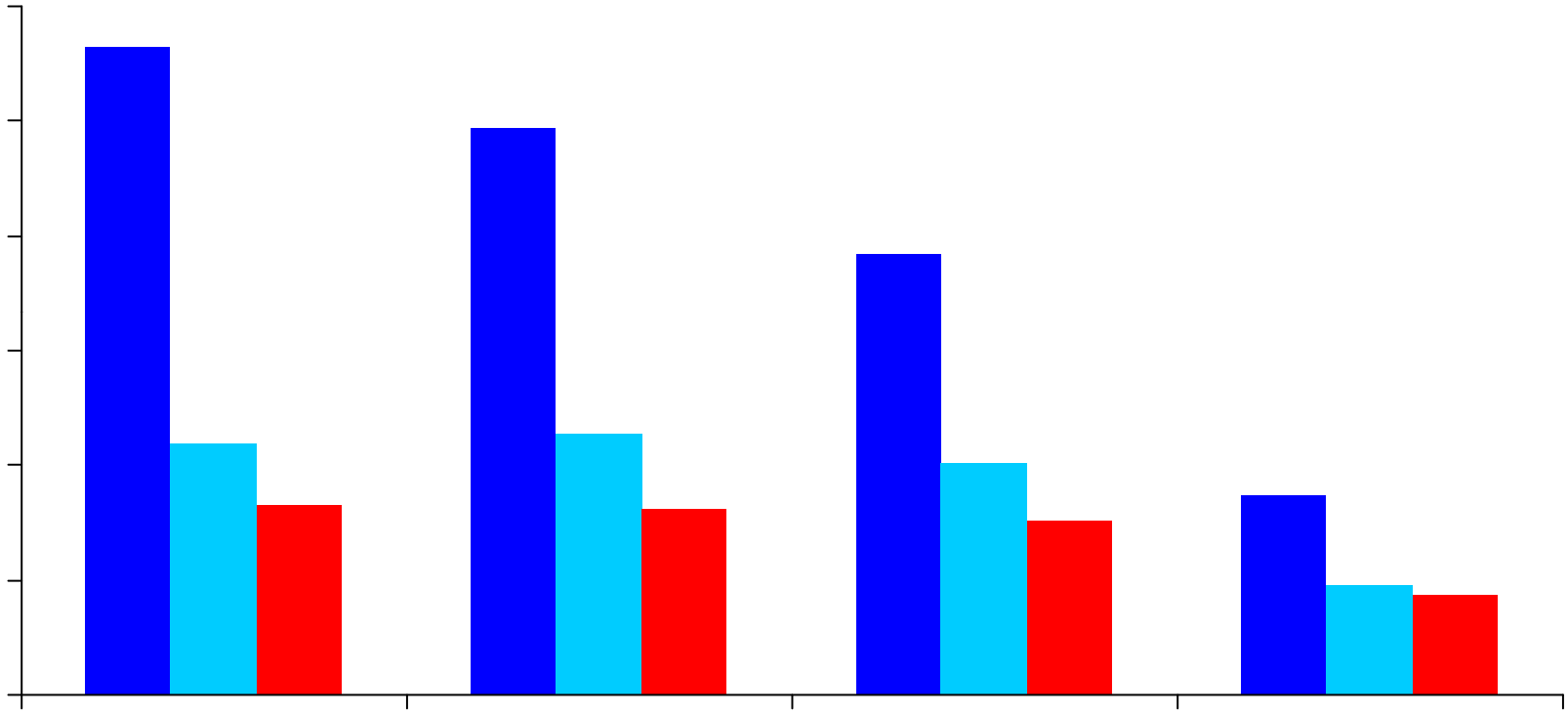

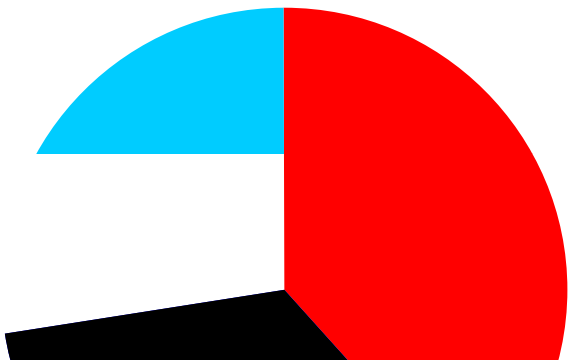

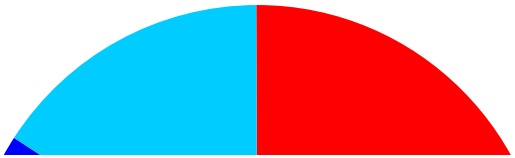

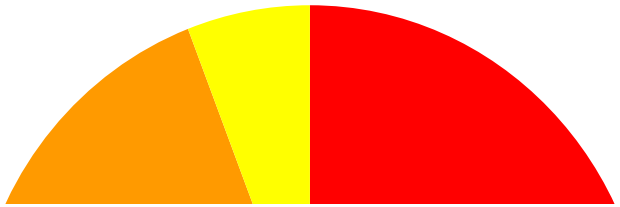

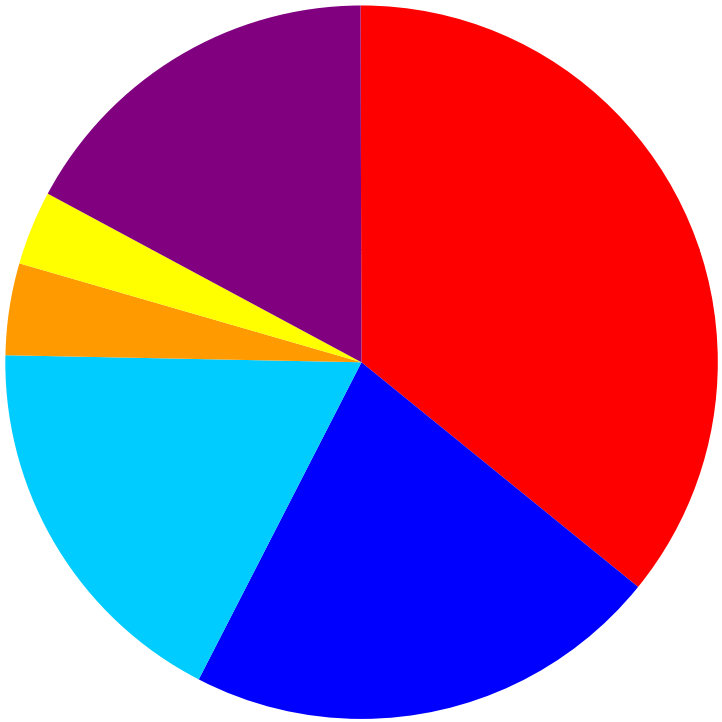

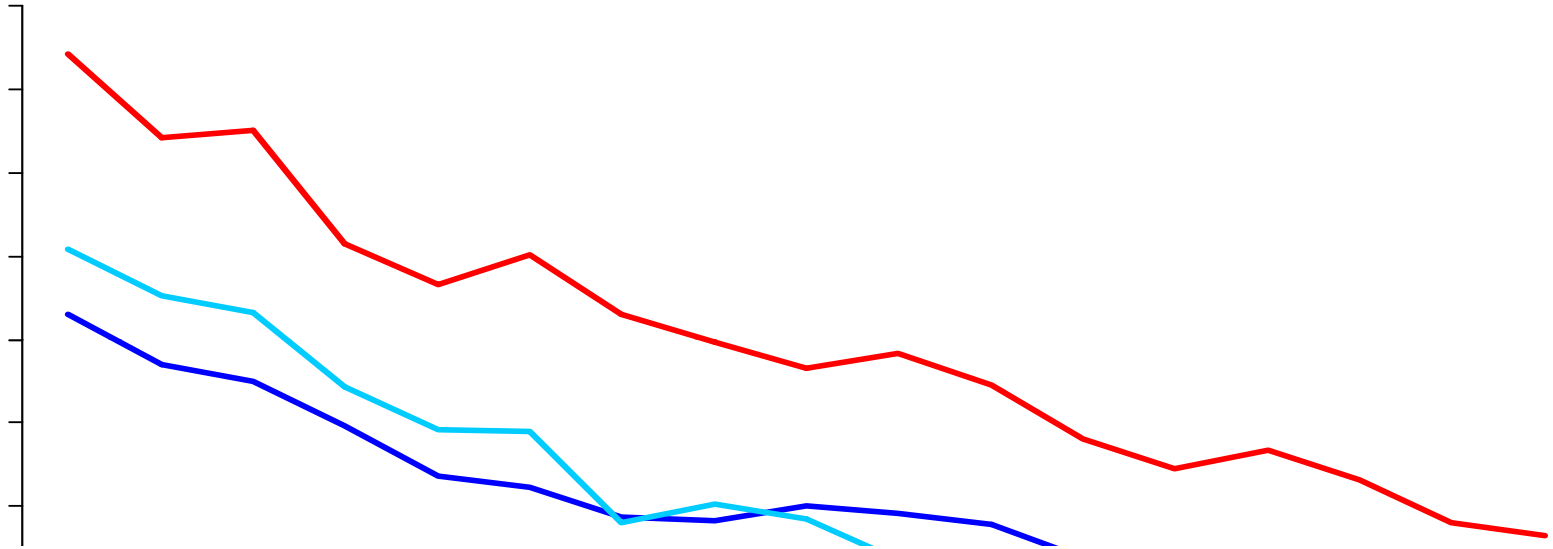

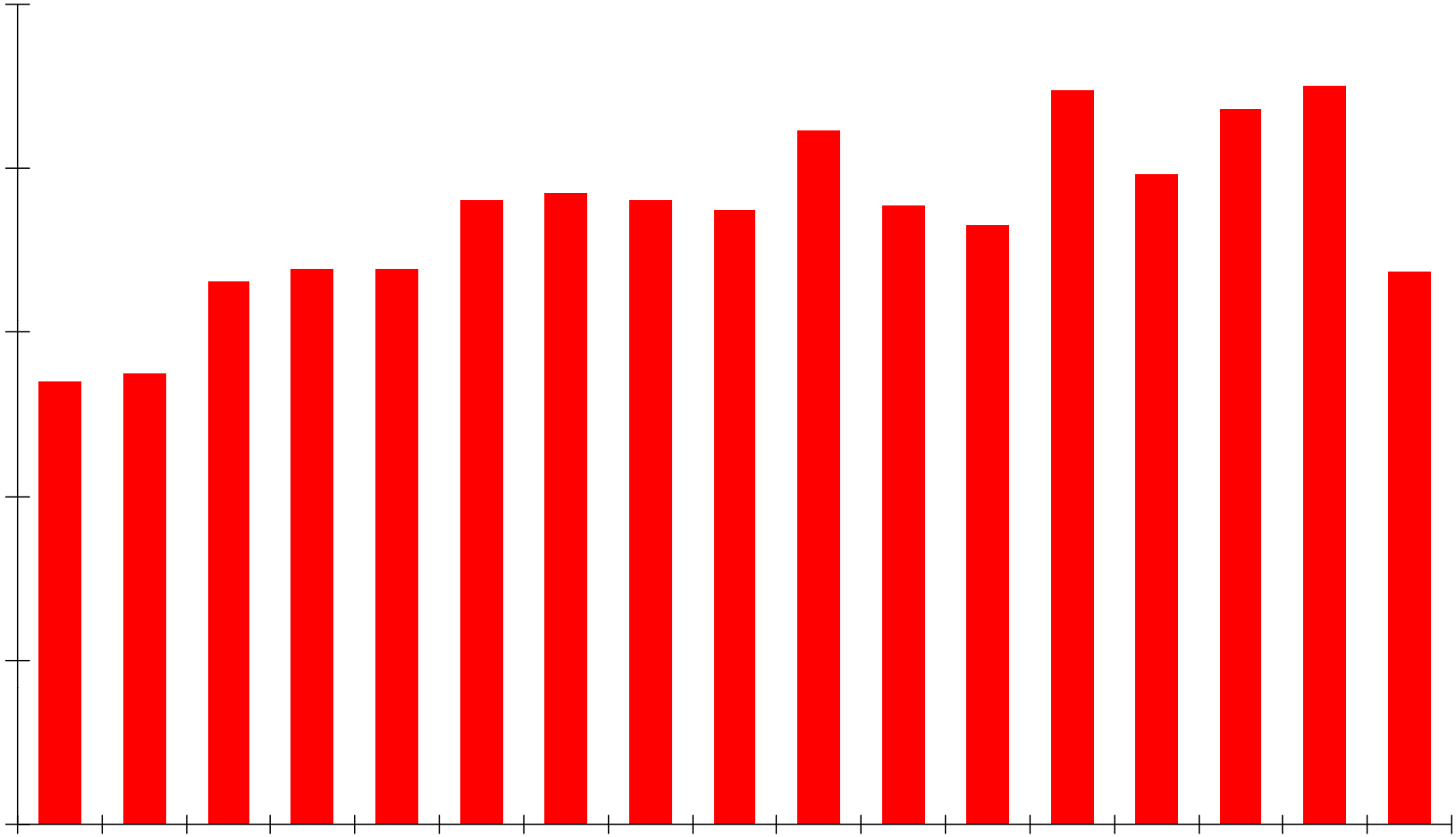

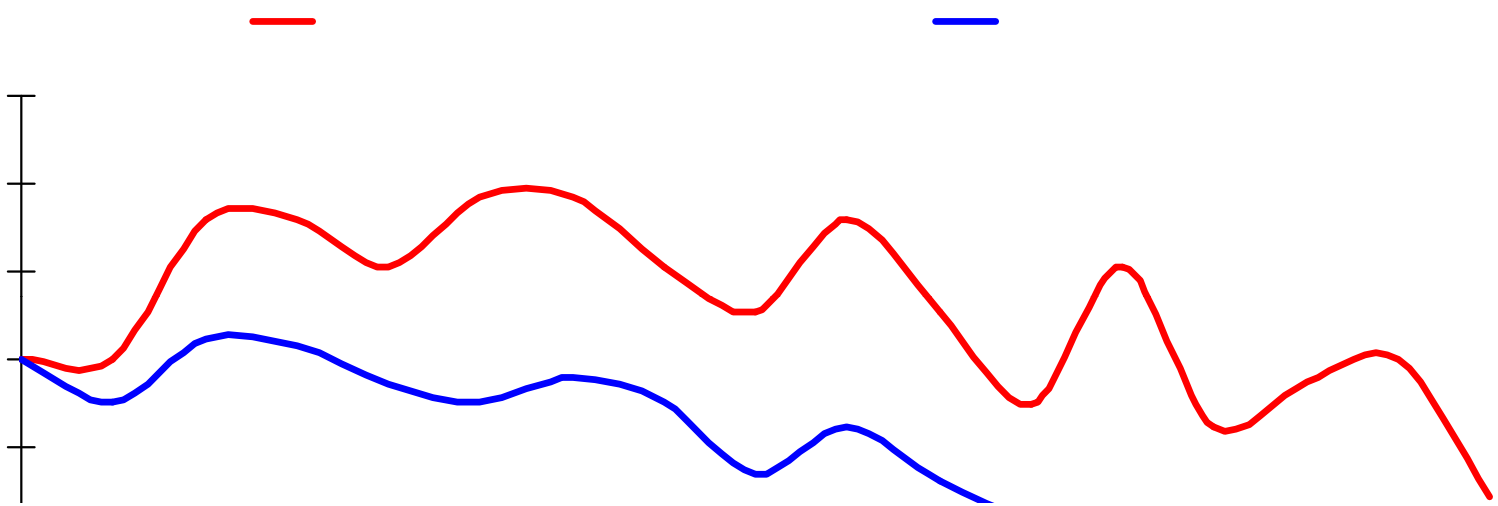

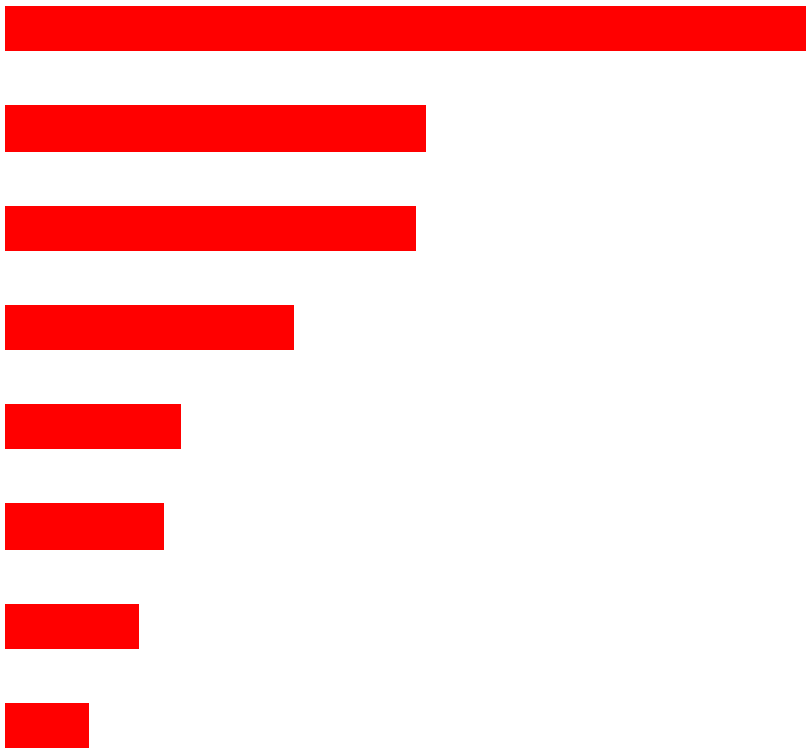

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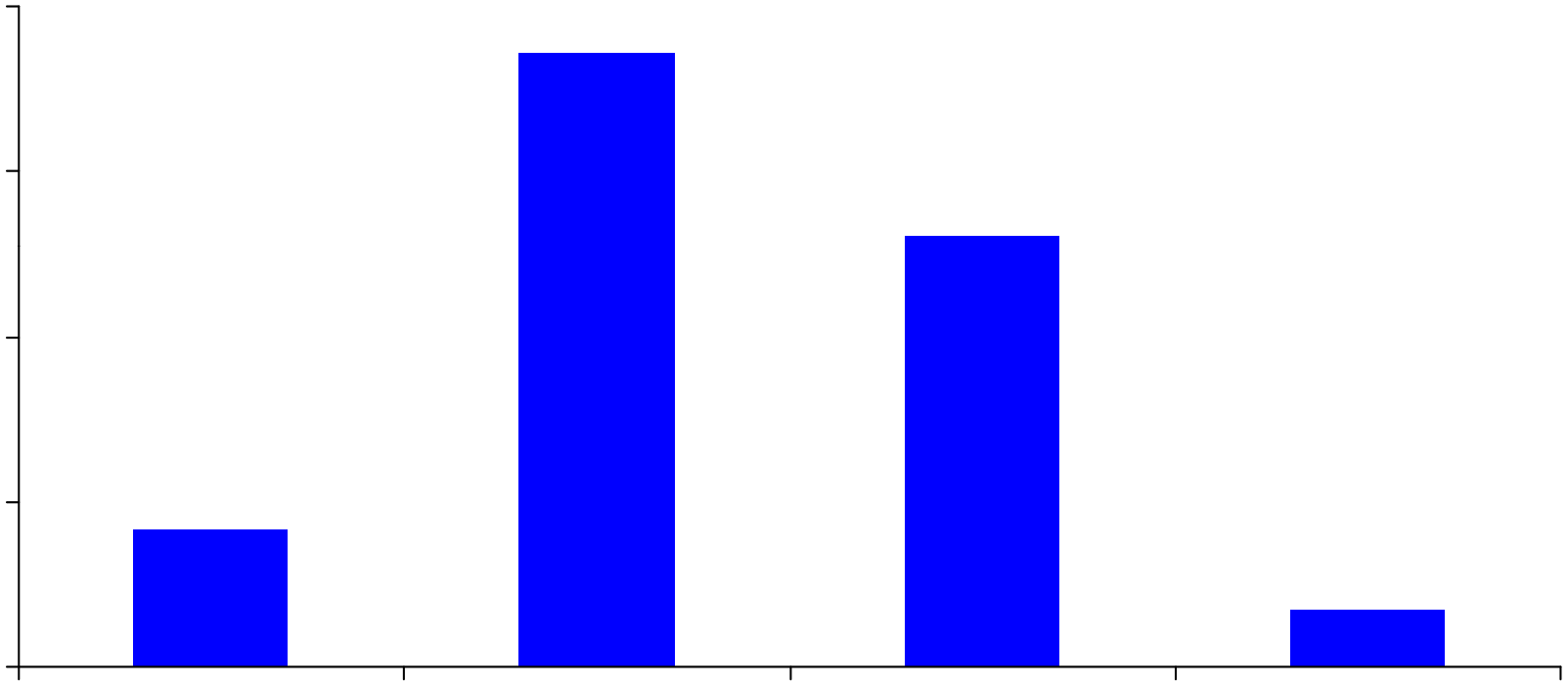

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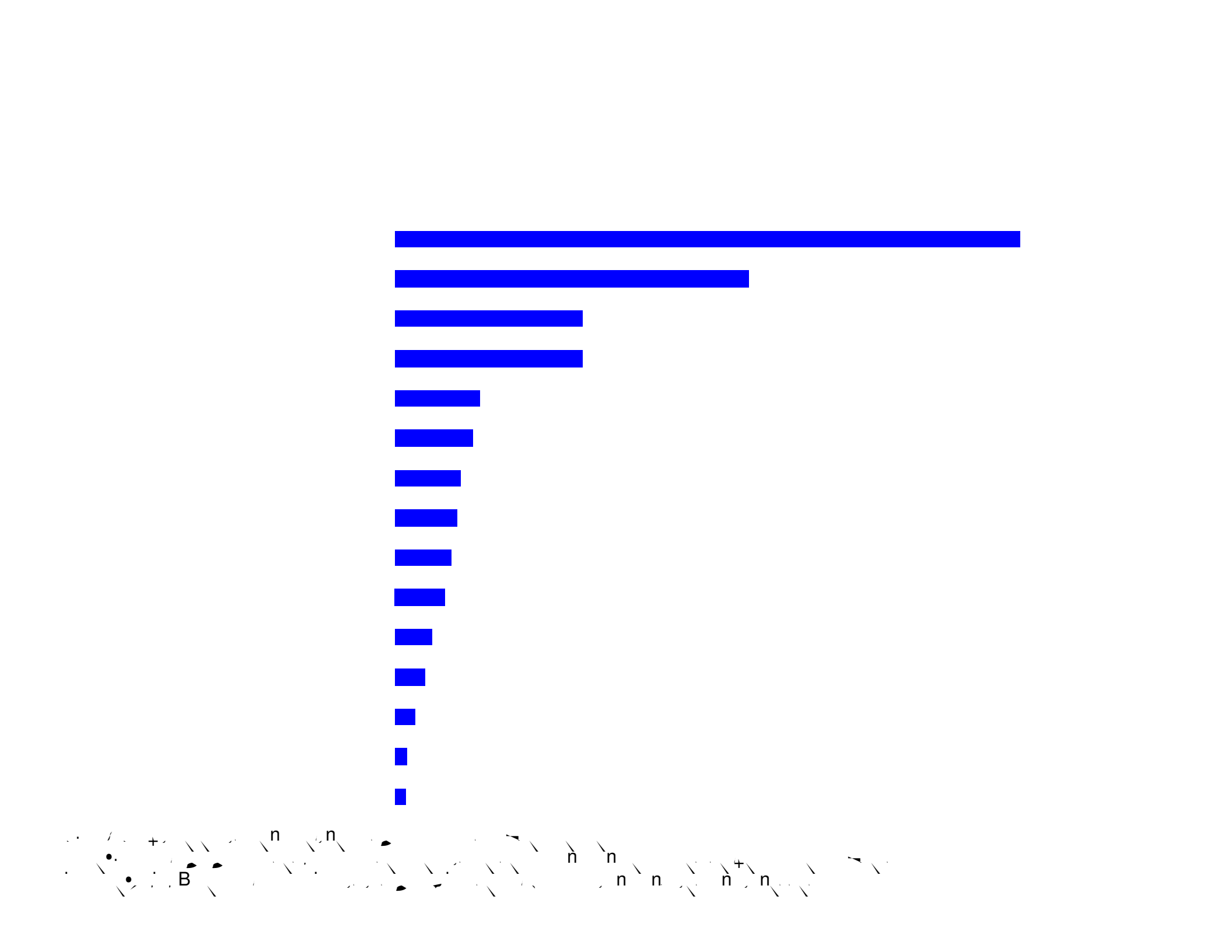

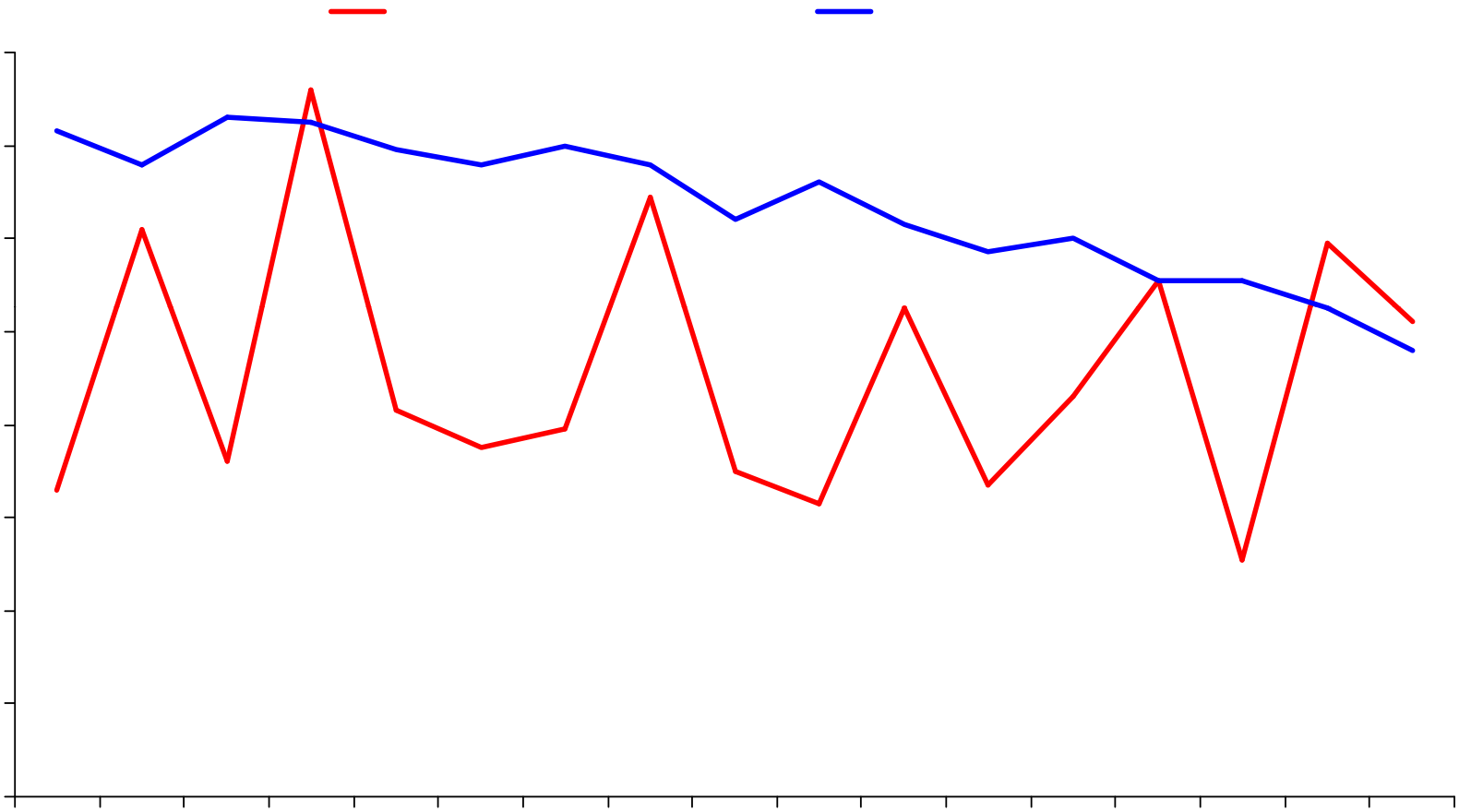

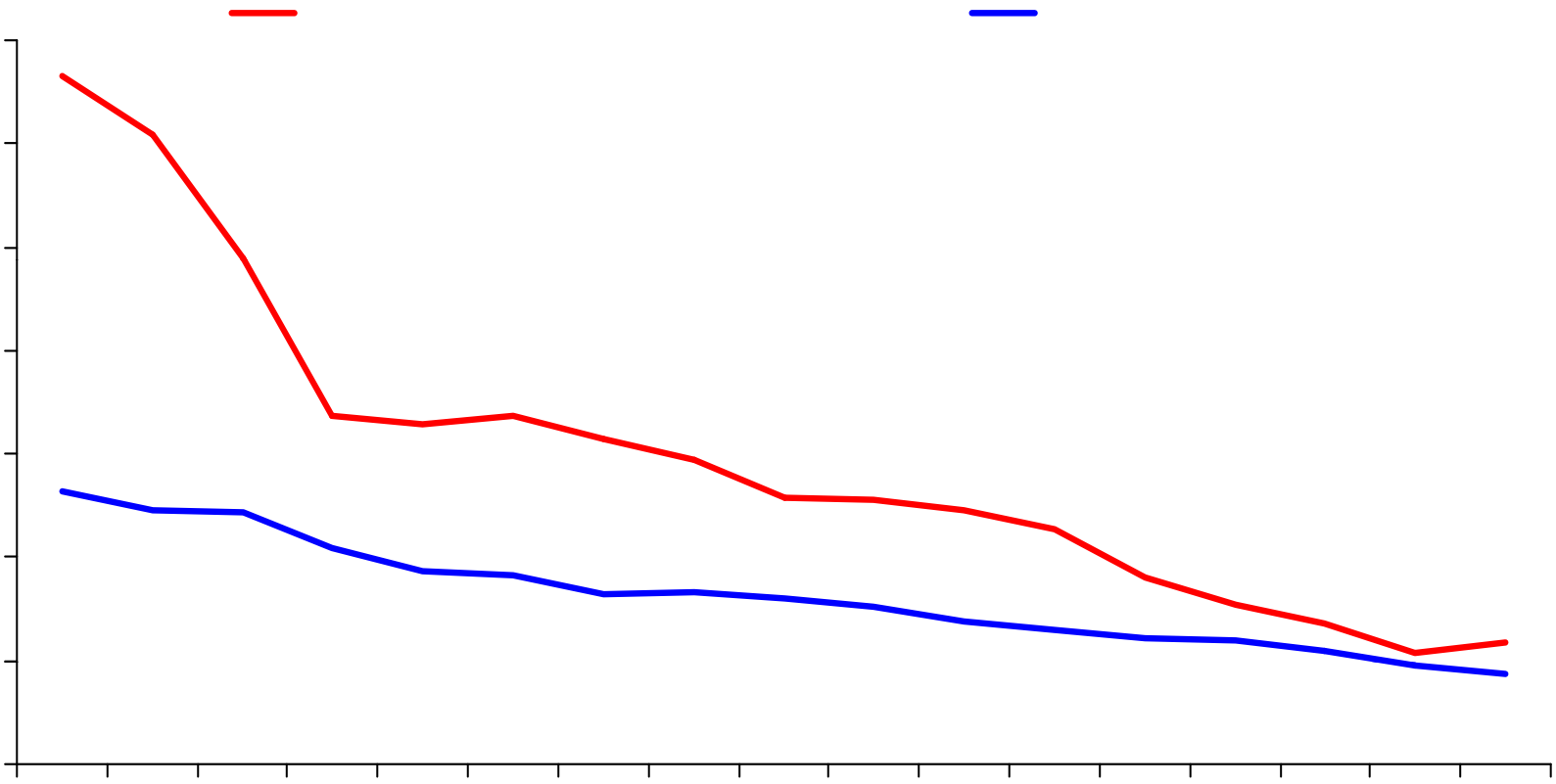

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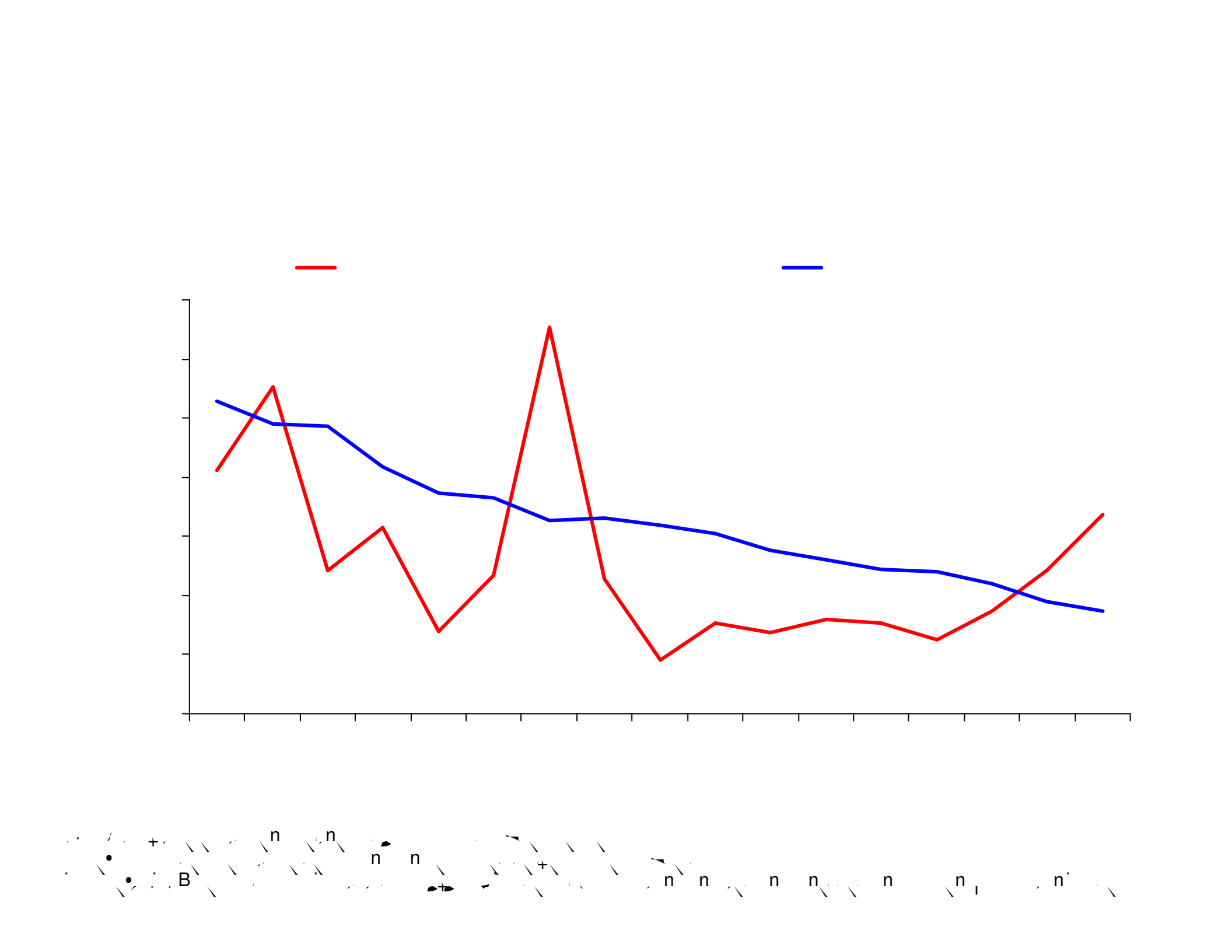

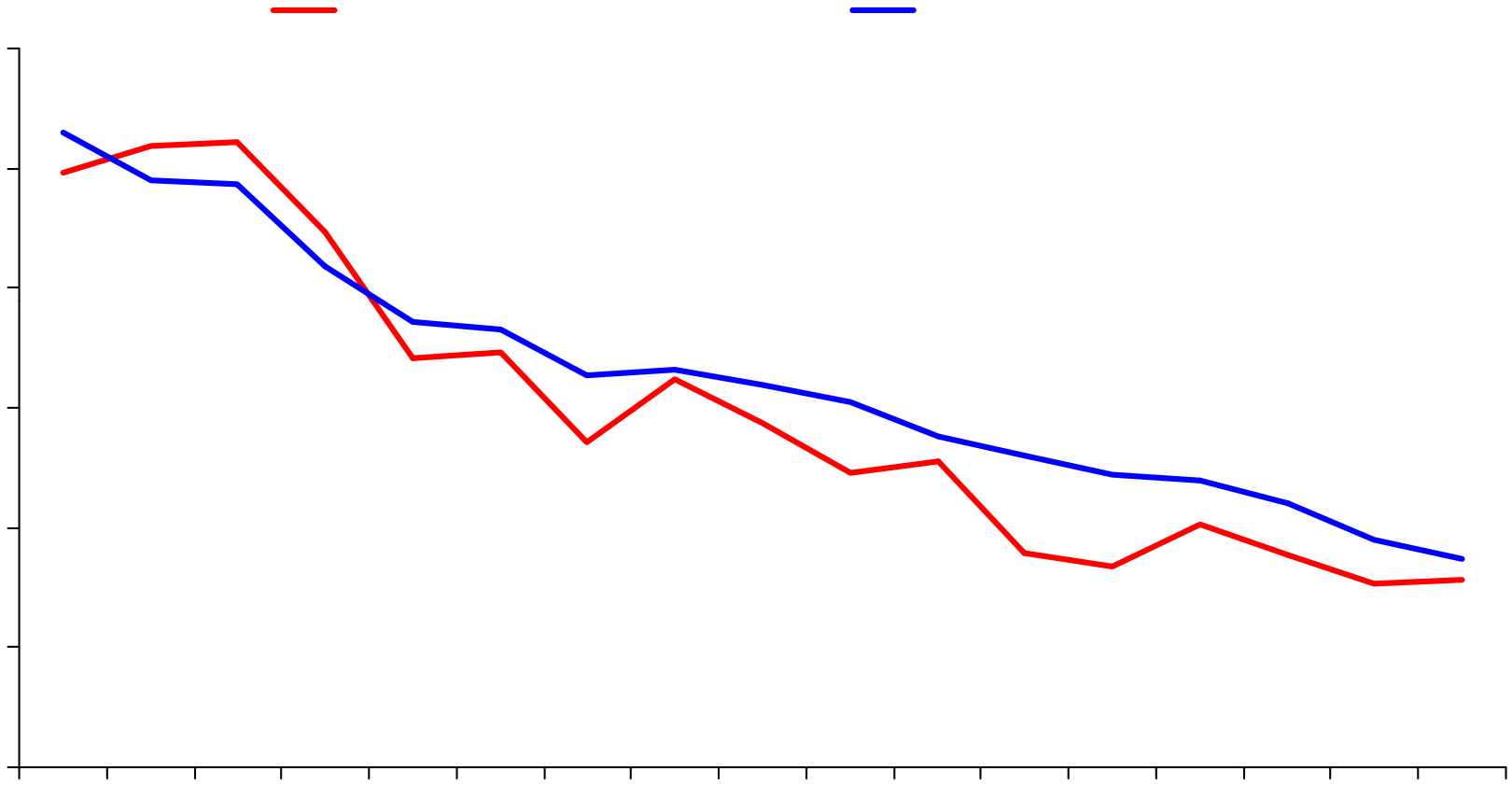

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