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Kapitaalvorming in infrastructuur in Nederland, 1800-1913

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SUMMARY

In the nineteenth century, the Dutch economy underwent a transition from a stagnant mercantilist system to a dynamic system of production, based on industry and modern services. The path this transformation took, and its exact timing are not yet fully understood. In this study, I investigated two probable determinants of the process, namely capital formation, and infrastructure.

The central question had the following two elements: (1) “What was the annual value of capital formation and the capital stock in infrastructure in the Netherlands in the period 1800-1913”; and: (2) “Which were the macroeconomic consequences of this?” I answered the first part of the question in chapters four to eleven. These chapters may, in the tradition of the *National Bureau of Economic Research*, and the *Conference on Income and Wealth*, be regarded as data appendices, which are at the heart of empirical macroeconomic research. Databases are presented with the annual value of capital formation and capital stocks for all sectors of infrastructure that are distinguished in this study: main railways, light railways and tramways (chapter 4), roads (chapter 5), shipping canals, and harbours (chapter 6), gas, water, and electricity (chapter 7), telephone, and telegraph

(chapter 8), drainage canals, and underdrainage (chapter 9), dikes (chapter 10), and land reclamation (chapter 11). The classification of infrastructure is presented and clarified in chapter 1. The second part of the central question is answered in chapter 3, through the presentation and analysis of the aggregated results.

The databases were built upon the guidelines of the United Nations' System of National Accounts, and upon the perpetual inventory-method, which is universally used by modern statistical agencies in their capital stock estimates. As such, these historical series are directly comparable to their present day counterparts. Unfortunately, the Dutch Central Statistical Office (*CBS*), has succeeded only in estimating the capital stocks for rail- and tramways. For some other sectors of infrastructure, *CBS* only gives capital formation figures, but not capital stocks. This study demonstrates, however, the feasibility of building annual time series for both capital formation and capital stocks for each sector of infrastructure for the period 1800-1913, in both current, and constant prices. Sensitivity- and quality-analyses proved that the series were robust, and reliable (chapter 3).

The databases were constructed bottom-up, starting from the micro-economic level. Investments made by all organisations involved, the central, provincial, and local governments, commercial companies, and individuals, were reconstructed and aggregated in order to arrive at macro-economic capital formation figures. If no archival or published sources were available for specific organisations, capital formation outlays were derived by other methods (with the help of plausible indicators, or via a quantifiable model). In chapter 2, I elaborated on the structural aspects of the construction of the databases, and on the main sources used.

Chapter 3 is the core of the study, as it forms the link between the more general parts (chapters 1 and 2) and the specific ones (chapters 4-11). It not only contains the aggregated time

series, but also the general analysis. An interesting aspect was the phasing of capital formation, derived from econometric analysis. This supported the existing picture of Dutch economic development, which was based (until recently) on mainly qualitative evidence.

The first half of the nineteenth century consisted of a long period of relative stagnation in infrastructural capital formation (phase 1, 1800-1851). Further research into the financing of investments is needed to judge whether irrational behaviour of private and public investors was a major cause of this stagnation, as is often thought. Certainly, the deplorable state of public resources did not contribute to a stable economic climate, inducing investments in infrastructural works which have a long period of gestation.

The second phase (1852-1865) was characterized by a rapid increase in capital formation. It proved to be the transition to the third phase (1866-1888), which was characterized by a relatively stable level of capital formation of over thirty million guilders (in constant prices of 1913). In this phase, railway, canal, and telegraph lines were built between the main ports of the country and the rapidly growing German hinterland. From this basis integrated transport and communications networks were constructed. The economic environment was improved by investments in dikes, polders, and drainage schemes. The sudden inception of this phase and its prominence in the overall picture called attention to the important changes in the Dutch macro-economic situation that occurred in the middle of the nineteenth century. One aspect of this was the completion of the reconstruction of the state budget. The impact of this was exemplified by the prominent position of the central government with the construction of main railways and shipping canals. However, this picture needed some qualification as well, as the private sector was present in nearly all fields of infrastructure construction. Thus, this phase of growth could also be interpreted as being demand driven by the German industrialisation. Indicative of rational

behaviour and of correct timing of investment by the public and private sectors, was the fact that the burden on the economy—in terms of direct consumption that had to be abstained from, since resources were spent on infrastructural capital investment—was relatively low compared to the main European economic powers (the United Kingdom, Germany, and France). The Dutch infrastructural investment ratio reached its zenith in 1877 with a level of 3.1% of GDP. Between 1889 and 1902, during the fourth phase, levels of capital formation decreased, partly as a result of the agricultural depression. Thereafter, in the fifth phase (1903-1913), they rose again. However, this was not due to specific autonomous factors (be they government policies or the growing German economy), but to general macro-economic growth. Capital formation was driven by domestic demand. This was apparent in the infrastructural investment ratio, which remained far below the levels reached in the third quarter of the nineteenth century. The same applied to the growth rates of the gross and net capital stock. Interestingly, infrastructural capital formation in this period consisted of small scale, flexible utilities (light railways, tramways, electricity, drinking water, telephone) rather than large scale, basic industries (main railways, and shipping canals). Limited liability companies and local governments were now more important participants, in contrast to the central governments involvement in the earlier period of growth.

In conclusion, it is argued that between 1866 and 1888 infrastructural capital formation created Rostowian ‘preconditions for take-off.’ Led by the central government, large investments took place in ‘heavy’ infrastructure. This created opportunities for further economic development. Yet, it would be a mistake to regard infrastructure as homogenous. The subdivision of infrastructure displayed new perspectives. These included a further phase of growth, taking place after 1903, which was driven by domestic demand, and based on

'light' utilities. This conclusion is important not only for gaining insight into the dynamics of nineteenth century infrastructural capital formation, but also for modern analysis of the possible role of infrastructure in the process of economic growth.