Guide for the external examiner.

This first set of questions refer primarily to chapters 2, 3 and 4 specifically sections 2.2, 2.3, 3.2,3.3,3.6 and 4.1.

Since the questions also relates to income growth in Europe, question 1.3, S. Broadberry's paper Accounting for the Great Divergence, 2015, is relevant. Question 1.4 is discussed in the textbook but additional coverage is found in M.Kelly and C.Ó Gráda, The preventive check in Medieval and pre-industrial England, Journal of Economic History, 72,4,2012.

The good answer should invoke both Smith and Malthus, if not in name at least in spirit. The *positive effects*, often called Smithian growth, are based on the gains from division of labour which can be realised only if aggregagte demand (the extent of the market in Smith's words) increases which would happen if population growth occurs also at constant income per head. Elaboration of why and how division of labour enhances labour efficiency is important. The textbook discusses economies of repetition and learning by doing. Some students might elaborate on Figure 2.1. The well read student notes that some Medieval and early modern technologies, such as those linked to the use of water and windmills, had high fixed costs but sharply falling unit costs when the scale of operation increased.

The *negative effects* are at the centre of the Malthusian explanation focusing on falling marginal labour product when land is in limited supply. The good student will discuss when and where in history the land constraint was binding.

Malthusian equilibrium is a situation where the morality rate, the so called crude death rate, is equal to the fertility rate , i.e. the crude birth rate, which implies income at subsistence and a constant population. The well read student will note that technological progress in a Malthusian model generates population growth but not permanent income above subsistence. Historically it seems as if there is a low rate of positive population growth at an income above subsistence and in some nations, which the well read student should be able to name, e.g. England, a slow rate of income growth from around 1500 to the industrial revolution. Italy represents an economy with growth to an income level well above subsistence before the Black Death.

Demographic analysis usually refers to Malthus concept of *preventive and positive checks*. The latter refers to how falling income can impact on mortality. Preventive checks refer to deliberate constraints on fertility triggered by economic hardship. Population control in Western Europe, Hajnal's so-called (Western) European Marriage Pattern, relied on late marriage , which implied high age at first birth. The attentive student also notes that there seems to be variations in spacing of births and limitation of the childbearing period of women by early 'stopping'. The longer the waiting time between births the smaller the completed fertility(family size). There is empirical evidence for preventive checks from Medieval times.

The *demographic transition* is the transition to a regime characterized by low fertility, low mortality, high life expectancy at birth and a completed fertility not much higher than 2 . That transition starts at around the end of the 19th century and beginning of the 20th century in Europe. Starting point differs among nations and it takes a couple of generations before the typical family size of the present era is established. This question leads naturally to the next regarding *declining fertility despite increasing income*. We believe that there is a change in preferences from quantity (number) of children to quality in terms of education of children. Although household income increased in the demographic transition the cost of raising children also increased since compulsory schooling was introduced and since the opportunity income of women (who used to take care of children) increased with rising employment opportunities , hence the cost (income foregone) of having children increased. Increasing educational level of women is linked to falling fertility, either because education increases the opportunity cost of children and/or the preference for quality relative to quantity is stronger among (well) educated women. That relationship also seems to be present in some pre-demographic transition economies as discussed in S.O.Becker et als, Does women's education affect fertility? European Review of Economic History,17,1, 2013.

Some students might discuss the paper by A. Björklund, Does family policy affect fertility, Lessons from Sweden, Journal of Population Economics, 19,2006, but it is not a requirement for a good grade.

Set 2

This set of questions refer to chapter 6.

(β)*Beta convergence*, as used by economic historians, is linked to the Gerschenkron concept of 'advantages of backwardsness'. The well read student acknowledges that. It is the negative

relationship between initial income per head in a sample of economies in an initial year, say in 1870, and the growth rates of income per head in a period after the initial year, say 1870-1913. The relationship is described using linear regressions in Figures 6.2 -6.4 in the textbook.

(σ)*Sigma convergence* is the narrowing of income gaps between nations, as measured , by the variance or as done in the textbook mainly by graphical representation of log GDP/cap and visual inspection whether log income gaps fall, increase or remain stable. The well read student observes that sigma is a symbol for variance.

The textbook mentions three *contributing factors to beta-convergence*: (i)technology transfer from advanced to less advanced economies but stress that the ability of nations to absorb new technologies depend on social and institutional capabilities. An understanding that technological knowledge is a non-rival good is essential here.(ii) Furthermore transfer of factors of production from low productivity sectors to high productivity sectors and (iii) diminishing returns to investment in capital, although the latter explanation does not seem to have unambiguous empirical support.

Periods of beta-convergence in Europe are 1870-1914 and 1950-1975, while the Inter-war period and the period from 1980(90) to 2010 did not have it. Most students probably discuss the 1817 to 1975 periods because they are presented in graphs (6.2-6.4) but the well read student also discusses the 1980(90) to 2010 period which is discussed in the text, p. 132.

Reasons for the absence of beta-convergence points at the fact that carriers of technology transfer, that is trade, capital flows and migration of labour were falling in the Inter-war period. For the 1980-2010 period diversity of economic policies and the varying trajectories of the formerly socialist economies should be mentioned.

Over and under performance. Figures 6.2-6.4 present linear regressions on the initial income and subsequent growth relationship. The regression represent expected performance. A nation above the regression line is an over-performer and a nation below is an underperformer. Under performance of initially poor nations is linked to low educational level, low trade exposure, absence of a technological intelligentsia, which could implement new technologies. These economies lacked the characteristics typical of the over-performer discussed on p.131. Students are free to choose particular examples of under and over performers.

Sigma-convergence latecomers. This question is linked to the question of under-performance. Late-comers discussed are Ireland and Spain. In both cases trade policy are mentioned as barriers to growth: openness starts the convergence process. The socialist economies growth performance can be mentioned, but it is not required.

Convergence relative to US. At first glance it seems as if the only major period of sigma convergence is the Golde Age (1950-1973). However the patterns is more complex.

GDP per head is not an ideal measure since US workers work more hours. Focusing instead on GDP per hour worked Europe continued to close the labour productivity gap at least until the mid 1990s when it started to increase again. The reason for that seems to be that the service industries in Europe lagged behind, except in Sweden, UK and the Netherlands. Manufacturing industry productivity gaps were small, however.