

WHY THE APPLICATION OF THE IS/IM MODEL CAN ONLY BE PARTIALLY VALID: AN ANALYSIS OF SWITZERLAND'S ECONOMIC POLICY MEASURES IN THE CORONA CRISIS

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ABSTRACT

This paper examines the partial end of the validity of the assumptions of the IS-LM model with regard to Switzerland's economic policy measures in the Corona crisis. The model assumes a closed economy, but Switzerland is a small, open economy. In the period under review, 2020, the slump in world trade triggered by the global Covid 19 pandemic did not leave Switzerland unscathed. Exports and imports shrank by seven and eleven percent respectively (cf. Federal Customs Administration 2020: n.d.). In some cases, trade came to such a standstill as a result of the protective measures imposed by the state that the country once again felt like a small, closed economy, even if only temporarily. In this context, the application of the IS/LM model is to be examined on the basis of the effects of the crisis. The general reading here, however, is not a theory-centred one-to-one translation of the model, but rather to apply the relationships discussed by the model to the current economic state of Switzerland. Both areas of economic policy, fiscal policy and monetary policy, can come into focus. The basic idea of the essay is based on an applicative literature review of the three articles "Prognose der SNB vom 17.12.2020 unter der Lupe Eine kritische Beurteilung", "Inflation als Auslaufmodell? Where does inflation remain?" and "Cognitive abandonment of the money glut - mentality towards the next wrong solution" (cf. "factfulness" 2021: o.p.). They all address the connection between money and goods markets, between government debt and central bank monetary policy, between inflation and economic growth, between efficiency and allocation losses in bureaucratic mechanisms in political systems in the sense of public choice theory. In keeping with the economic approach, one piece of the puzzle of the whole is now examined, in the knowledge that only several parts make a whole. The paper wants to give a basic thought whether macroeconomic models are outdated or not and not in the sense of Fukuyama. Because these models are adaptable according to their time and their insights can be carried along into new models and theories.

Keywords: IS/LM model, economic policy Switzerland, validity, Corona crisis.

INTRODUCTION

In order to do justice to the context of the study, explicit reference is made to the goods market as a small economic cycle and to the money market as a) a refinancing instrument of the banks for the supply of banknotes and b) as a political instrument via the determination of key interest rates. This then implies an extension of the LM curve, as these political connotations are not considered in their originality. The overarching context of the paper deals with the question whether conventional macroeconomic models have had their day. Already at this point it should be pointed out that these models always and depending on the "trend" or historical

context seem either up-to-date or outdated. However, this does not mean that they fundamentally misrepresent basic relationships.

In order to understand the interrelationships of a diametric dialectic of money and goods markets, of income, investment, expectations, money demand and money supply, and of the interest rate as a theoretical regulator and de facto behavioral controller, the paper will show that knowledge of the fundamentals of the IS-LM model can tackle a partially potent analysis of Switzerland's economic policy.

Methodology

Based on a selection of basic texts according to criteria of validity and relevance, which, in addition to the primary works to be examined, contain the basic framework of the analysis, the IS/LM model is applied to the economic policy of Switzerland in times of the Corona crisis in order to arrive at findings that indicate the validity of the model or its obsolescence. The in-depth analysis of the literature requires the integration of further scientific texts and their evaluation.

Literature Review, Presentation and Application of the IS/LM Model

The British economist John Maynard Keynes published a book entitled "General Theory of Employment, Interest and Money" in 1936. In it, he examined economic fluctuations in general and the Great Depression in particular, which occurred in 1929 as a result of the collapse of the New York Stock Exchange (cf. Felderer et al. 2003: 97). Due to the difficulty of understanding his writing, there was a great deal of debate about the significance of his work. In 1937, the British economist John Hicks summarised what he saw as Keynes' central contribution as a joint description of goods, money and financial markets.

His analysis was later extended by the US economist Alvin Hansen. Hansen and Hicks finally called their formalization the IS-LM model (cf. Blanchard et al. 2009: 135). The model allows the study of the interplay of goods, money and financial markets and the analysis of the determinants of output and interest rates in the short run. In this theoretical explication, after a thorough exposition, monetary and fiscal policy measures of Switzerland after the outbreak of the Covid 19 pandemic can be examined. Admittedly, only the domestic market is considered. In this chapter, the IS-LM model will first be derived. Subsequently, the SNB's monetary policy in recent years can be analysed and located in terms of a model.

Derivation of the IS curve

The IS-LM model is a demand-led model of a closed economy. This means that no foreign trade exists in it. Within the model, the entire economy consists only of a goods market and a money market. Basic assumptions are a constant price level due to the short-term analysis, an underemployment situation as a starting point and that the demand for goods determines production and thus the supply of goods (cf. Richert 2007: 104). First, the goods market is considered, which is the basis for deriving the IS curve (cf. Blanchard op. cit.: 135). Aggregate demand in the goods market is composed of household consumption (C), business investment (I), government expenditure (G) and net exports (NX) as the difference between exports and imports (cf. Mankiw et al. 2012: 605). However, net exports are neglected due to the analysis of a closed economy (cf. Blanchard op. cit.: 82) The planned aggregate demand for goods is thus:

Formula: Planned aggregate demand for goods

$$Y^D = C + I + G$$

(1)

Source own illustration based on Blanchard, O., Illing, G., Macroeconomics, 2009, p. 83

Consumption "includes household expenditure on goods and services" (Mankiw op. cit.). It depends on disposable income, i.e. the income "at the household's disposal after receiving transfers from the state and paying taxes" (Blanchard op. cit.: 83) It is given as:

Formula: Disposable income

$$Y^D = Y - T \quad (2)$$

Source: Blanchard et al.: op. cit., p. 84

T stands for taxes less transfers. The relationship between consumption and disposable income can in turn be expressed by the following function:

Formula: Consumption function

$$C = C(Y-T)$$

(3)

Source: Blanchard et al.: op. cit., p. 85

Consumption is positively dependent on disposable income, i.e. if (disposable) income increases, consumption also increases. The same applies to reductions (ibid.).

In April 2020, around 1.3 million employees (cf. Fig. 1) in Switzerland will be on short-time working (cf. Regiosuisse 2021: o.S.). The cantons of Graubünden, Ticino, Neuchâtel and Zurich are most affected. A total of 18.6 million working hours will be lost by December 2020 due to the Corona crisis (cf. Destatis 2021b: o.S.). The unemployment rate rises from 2.3 percent in January to 3.4 percent in May 2020 (cf. Regiosuisse 2021b: o.p.). Private consumer spending amounts to CHF 358.3 billion in 2020, significantly below the previous year's level of CHF 371.5 billion (cf. Destatis 2021a: o.S.). "According to estimates by the Swiss Institute of Economic Research at ETH Zurich (KOF), disposable incomes (after deduction of taxes, social security contributions and health insurance premiums) in Switzerland are likely to have fallen by 10% during the lockdown" (Rütli 2021: o.S.).

Already in March, the Federal Council was able to provide a package of measures amounting to eight billion francs for short-time work compensation (cf. Eichenauer et al. 2021: o.S.). In this way, wage losses can be compensated and jobs preserved. In the short term, the success speaks for itself. Short-time work costs Swiss employees a total of CHF 12 billion (cf. Loss 2020: n.d.). This corresponds almost entirely to the 2.6 percent decline in private consumer spending. In the assumption $C = Y$ of the Keynesian cross a theoretically already implied correlation in 2020. The decline in income is moderate due to the measures taken by the Swiss government. Worse can be avoided by resorting to short-time work measures. More critical in this context, however, are the long-term indicators.

"This indicator already suggests that there will be a lasting economic downturn and that GDP will not return to the trend seen before the outbreak of the pandemic. (...) The analysis (...) highlights the risk of long-term unemployment. According to these findings, the recovery in the labour market after the current crisis could take longer than in previous recessions" (Lalife et al. 2021: n.d.) In the research context of the paper, reference should be made to the generally short-term orientation of the IS-LM model (cf. Mankiw op.cit.: 407). This orientation also includes hardening effects in the price level. This cannot be confirmed for 2020, as the HICP inflation rate fell by 0.8 percent (cf. Destatis 2021c: n.d.).

Also inherent in the model is the assumption of constant tax revenues. A review of income tax rates in the KPMG Tax Report of 2020 reveals an almost rigid average income tax rate of 33.8 percent (cf. Tax Report 2020: n.d.) Overall, an assessment of the data reveals a significant dialectic between the decline in disposable income and the decline in consumption. The

Keynesian cross can be used as a basis for taking fiscal policy measures, as the programmes taken have a stabilising effect on the economy (cf. Benz et al. 2021: o.S.). A strong leftward shift of the IS curve is not necessary. Let us next look at the second part of the IS curve.

Investment is the "acquisition of goods ... that will be used in the future to produce new goods and services" (Mankiw op. cit.: 407). Investment is negatively related to the interest rate (r) because the higher the interest rate, the less attractive it becomes for firms to borrow money to make, for example, a replacement or expansion investment. If the interest rate is too high, the interest payments can no longer be covered by the additional profits from the use of fixed assets, so that the investment is unprofitable. Accordingly, an increase in financing costs leads to decreasing capital expenditures. This also applies to self-financing, since this must be able to be calculated with the principle of opportunity costs in a consideration of the imputed interest rate like external financing (ibid.: 606). Moreover, investment is positively dependent on economic expectations (used as synonyms) 1Y (cf. Blanchard et al. op. cit.: 137). The investment function is thus:

Formula: Investment function

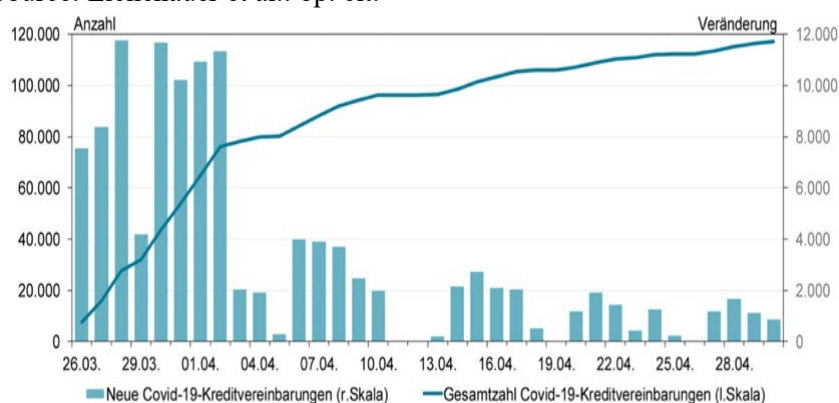
$$I = I(Y, r) \quad (4)$$

Source: Blanchard et al.: op. cit., p. 85

Intuition Switzerland: In addition to the measures taken on the labor market, it is above all the investment activity of companies that allows conclusions to be drawn about how GDP could develop. Indeed, under the assumption of the combination of production factors, expansion investments always mean job creation. Thus, a second pillar of structural maintenance could be installed in the pandemic. This allows companies to take out loans guaranteed by the Swiss government (cf. Eichenauer et al. 2021: o.p.). "Liquidity support for SMEs of up to 20 billion francs (40 billion francs from 3 April) was announced on 20 March and could be applied for from the respective house bank from 26 March (Eichenauer 2021: op. cit.)." There is particularly strong demand for loans to secure liquidity (cf. Fig. 1).

Fig. 1: Credit agreements in Corona times

Source: Eichenauer et al.: op. cit.



By 23 September 2020, 124 banks will have concluded almost 118,000 loan agreements with a total volume of 16.9 billion francs. The average bridging amount is 102,000 francs (cf. Swiss Confederation: Covid 19 bridging loans: o.S., o.J., n.d.).

Despite government aid, 27 percent of firms are revising their investment plans, while 32 percent of firms report investing less than they did in 2019 (see Eichenauer et al.: op. cit.). "In fact, over one-third of respondents indicated that delaying investment plans was moderately to highly important in combating the economic impact of the COVID-19 pandemic. More than a

¹ From the point of view of the optimality criterion of an equilibrium goods market, the terms can be used synonymously in this model if supply and demand are to be identical (author's note).

quarter even forewent investment entirely during the crisis. Only 15% launched new investment projects in response to the crisis" (Eichenauer op. cit.).

Overall, a lower fixed capital investment for 2020 of just under nine percent can be extrapolated from the available data (ibid.). In addition to information on planned investment activity, companies' economic expectations also play a role. It can be seen that only three percent of the companies surveyed expect long-term negative consequences from the pandemic and six percent expect medium-term negative consequences. (Cf. Destatis 2021c: o.S.).

The last component of demand in closed economies is government expenditure (G). However, both government expenditure and taxes (government revenue) are considered exogenous, i.e. they are not explained in the model (cf. Blanchard op. cit.: 85).

Formula: Extended aggregate demand for goods

$$Y^D = C(Y-T) + I(Y,r) + G(t)$$

(5)

Source: Blanchard et al.: op. cit., p. 137

Equilibrium in the goods market exists when actual expenditure equals planned expenditure. In other words, if the production of goods equals the demand for goods (ibid: 86), the following applies:

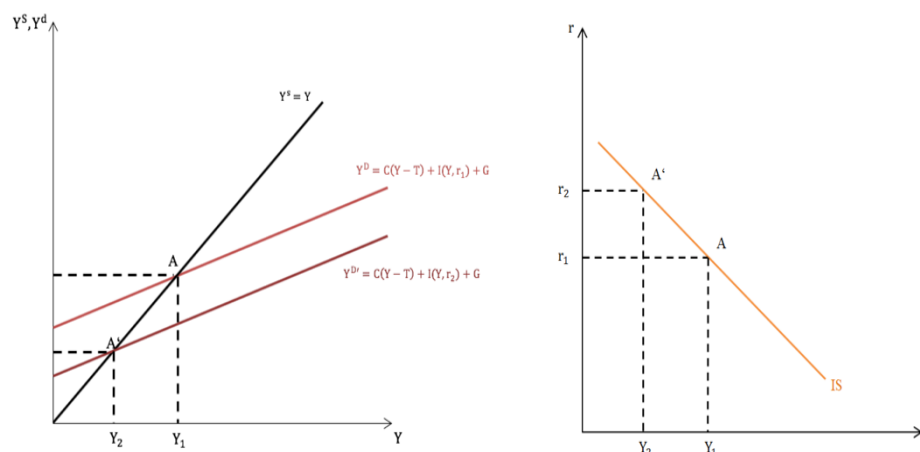
Formula: Equilibrium condition on the goods market

$$Y = Y^D$$

Source: Blanchard et al.: op. cit., p. 89

With the help of the previous explanations, the IS curve can now be derived graphically.

Fig. 2: Derivation of the IS curve



Source: own representation according to Blanchard et al.: op. cit., p. 140

The goods market equilibrium thus implies: the higher the interest rate, the lower the equilibrium income. The IS curve thus shows all combinations of interest rate and income level at which the goods market is in equilibrium. Since the key interest rate in Switzerland has remained constant at -0.75 per cent since 2019 (cf. SNB 2021: n.d.), the government policy packages can be regarded as stimuli that influence expectations and simplify lending, which tend to prevent a leftward shift of the IS curve.

And indeed, such an observation can be made. GDP has declined by 3.3 percent, the unemployment rate averages 3.4 percent in 2020, and 71 percent of the companies surveyed see low to very low probabilities of running into financial difficulties due to the Covid 19

pandemic (cf. Destatis 2021d: op. cit.). Overall, Switzerland's output gap in 2020 is 4.3 percent, which is good given the circumstances (ibid.).

Conclusion I: The implications of the IS curve provide a basic understanding of the effects of income declines that are associated with either falling wage levels or falling employment rates. In addition, reference can be made to business investment, which turns out to be quite sensitive to interest rates. In times of constantly low key interest rates, however, the room for manoeuvre here has been narrowed considerably in recent years. Furthermore, economic policy measures can be seen as confidence-building if, despite a major crisis, the country's own economy is supported by the state via the corresponding programmes. Since the IS curve primarily represents behavioural patterns of households and companies, albeit in a closed economy without banks, many of the measures taken can be assessed as basically based on this model. For ultimately two things are model-immanent. On the one hand, the development of incomes, which, according to Keynes' fundamental psychological law, always means an increase in consumption and vice versa. On the other hand, the dependence of interest rates and investments on the future expectations of companies. Every measure taken by the state is aimed at this.

Derivation of the LM curve

In the money market, it is assumed that economic agents hold money only in the form of cash, so that the entire money supply consists only of cash provided by the central bank (cf. Blanchard loc. cit.: 108). The assets of economic agents consist of money and fixed-interest securities (cf. Richert, op. cit.: 71).

According to Keynes, the aggregate demand for money consists of three cash holding motives: the income-dependent transaction cash, the income-dependent precautionary cash and the interest-dependent speculative cash (ibid.). The aggregate demand for money is obtained by adding up the coffers and, according to the liquidity preference theory, it depends positively on income and negatively on the interest rate.

Formula: Aggregate demand for money

$$L = L_T + L_V + L_S = L(r, Y) \quad (7)$$

Source: Adapted from Richert, R., *Macroeconomics*, 2007, p. 75.

The real money supply, in turn (the money supply expressed in units of goods), is obtained by dividing the nominal money supply (M), which is determined by the central bank and is exogenous, by the short-term constant price level (P). Equilibrium on the money market prevails when the real money supply corresponds to the real money demand (cf. Blanchard op. cit.: 143).

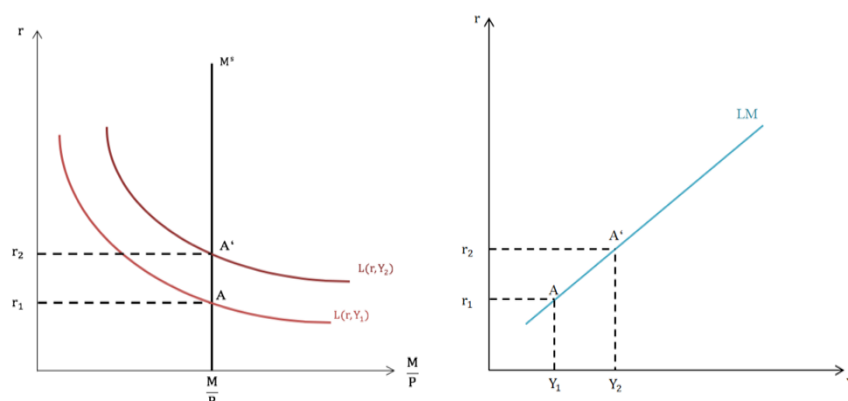
Formula: Equilibrium condition on the money market

$$M/P = L(r, Y) \quad (8)$$

Source: Adapted from Blanchard, O., Illing, G., *Macroeconomics*, 2009, p. 143.

The money market equilibrium is referred to as a stable equilibrium, since an equilibrium arises on the money market in the case of a money supply surplus (left above A) through interest rate cuts and in the case of a money demand surplus (right below A) through interest rate increases (cf. Mankiw op. cit.: 396f.). With the help of the previous explanations, the LM curve can now be derived graphically.

Fig. 3: Derivation of the LM curve



Source: Adapted from Blanchard, O., Illing, G., *Macroeconomics*, 2009, p. 145.

A justified criticism of the LM curve (cf. Jaeger 2001: 208) is the arbitrariness with which a central bank can set the key interest rate without having to resort to major monetary expansions. If one integrates this approach into the paradigm according to which money supply and money demand are supposed to be in equilibrium, the LM can be replaced by any politically arbitrary decision in the sense of the Taylor rule (cf. Hartmann 2019: 2ff.), but the mechanism that interprets the interest rate as a behavioural incentive remains.

The key interest rate controls the costs of refinancing for banks on the money market (the interbank market is excluded). Accordingly, the increase in the money supply is more about influencing inflation and investment (cf. Degussa 2019: 4). If the interest rate level approaches the zero line or even falls below it, as is currently the case with the SNB's pre-set key interest rate, the LM curve is a horizontal line. This graph cannot be shifted to the right, which is why the intersection of the IS and LM curves cannot be influenced.

Accordingly, the model provides an important indicator that other determinants and even unconventional monetary policy measures must be part of the monetary policy currently being implemented. Thus, in the wake of the Corona crisis, it is a question of easy access to bridging loans guaranteed by the state and, above all, intervention in the foreign exchange market. "By means of a new facility, the SNB is offering banks the opportunity to refinance loans guaranteed by the government at our key interest rate, currently -0.75%. The SNB-COVID-19 refinancing facility increases banks' liquidity and their capacity to extend cheap credit" (Jordan 2020: 4).

In the context of this paper, this cannot be examined in more detail, because the underlying model does not consider any answer to this question. At this point, the IS/LM model would have to be extended to include the foreign trade components, which is explicitly not the subject of this paper. Thus, we have to look at inflation. Due to the SNB monetary policy, this has been constant in Switzerland for years at an average of 1.7 percent between 1979 and 2019 (cf. Country Data 2019: o.p.), as the SNB strategically aims for an inflation target between 0 and two percent and accordingly reacts cautiously on the capital markets (ibid.).

Despite the Corona crisis and short-time work, real wages in Switzerland even rose by 1.2 percent in 2020 (cf. Destatis 2020: n.d.). These figures do not fit the monetarist reading, which is why many Keynesians want to throw the quantity equation on the 'rubbish heap of the history of ideas' at the same time (cf. Rötheli 2020: n.d.). What does this mean for the LM curve? Certainly, its explanatory power can be judged as obsolete in current times, but the basic lines

of thought it insinuates are not. There is even a possibility that old models like the IS-LM model could be given a new lease of life (see discussion).

Conclusion II: When assessing the relevance of the LM curve to the current situation in Switzerland, only a few implications can be discussed that actually occur. For example, it is certainly true that the position of the LM curve has been horizontal for years, i.e. that no economic stimulus can be triggered via the money supply. This knowledge, in turn, provides the basis for several studies that monetary policy can only be effective in countries with high inflation rates. Since inflation in Switzerland has been at a constantly low level for years, other monetary policy operations in the sense of intervention on the foreign exchange markets are undertaken. These play outside the model.

FINAL CONCLUSIONS

This paper attempts to assess Switzerland's economic policy by applying the IS/LM model. In the first part (goods market), parallels are discovered between the assumptions of the model and the interdependencies that it is supposed to explain. Rigid prices, the dependence of consumption on income, the motivation of firms to invest due to low interest rates and future expectations are things that are explained in the model. Government activity *ceteris paribus* in this context implies that there should be no exceptional measures at all. On closer inspection, however, this is not the case, but that does not matter too much. For the IS curve wants to make statements about the behaviour of economic agents in the small business cycle. This knowledge, in turn, is used to devise and implement appropriate fiscal policy measures.

The second part (money market) shows a different situation. Today, the motives of money demand alone are no longer sufficient to cope with the SNB's flood of money. Moreover, the key interest rate is not interpreted as the result of the behaviour of economic agents offering and demanding money on the money market, but as an arbitrary political decision, the basis of which is not explained in more detail in the context of the study. Therefore, the question is rather what lessons and what actions can be drawn and taken with the knowledge of the IS-LM model. It must be noted at this point that the LM curve must rather be removed from the equation.

One of these measures, in turn, has been discussed for years and could offer the model a renaissance. In a full money system, the original mechanisms would always be able to be adhered to if banks were deprived of the power to create money and states had to give up their monopoly on money. A basis for discussion would thus be, from the result of this work, to dare a little more Hayek.

In the final analysis, it can be said that Switzerland's economic policy measures were successful, at least in the short term. The inflation rate, unemployment, decline in purchasing power, economic expectations and GDP development paint a far less pessimistic picture than forecasts did at the beginning of the pandemic. The model provides good and structuring guidance on how such a policy can be assessed. In plain language, this means that curves do not first have to be shifted in order to clarify how expansionary fiscal policy works or whether expansionary monetary policy still works at all.

The original relationships that explain and perhaps also forecast the interaction of fiscal and monetary policy are the core idea of any theory building. This does not mean, however, that just because the complexities of reality change, any model can no longer apply. On the contrary,

only the mix of theoretical knowledge and practical experience can lead to the final assessment. Since the IS/LM model is still one of the standard models of macroeconomics and since it can still be used to explain the basic paths of action on the goods and money markets, albeit not in their entirety, it cannot be claimed that this model is no longer relevant. Apart from that, there is no single economic theory or model that can explain economic reality in a complex, political, geographical and social world. Reductionism is therefore still the order of the day. And if one considers in this context that models always want to and can only explain parts of reality, it is not particularly bad if these parts are sometimes smaller and sometimes larger.

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