Group Work Project – Submission 2

Objective

The objective of this study is to employ both statistical analysis and macroeconomic modelling techniques, identify a set of primary risk factors or economic variables and its effect on both the local economy and the markets involved, discussing the validity of our analysis in submission 1.

Five countries were considered for analysis to explore the effects of macroeconomic variables on the Eurozone crisis: 2 strong central Euro countries (Germany and France), 2 weak Euro periphery countries (Italy and Greece) and then the United States for modelling the effects of the financial crisis of 2008 on triggering the Eurozone crisis.

Indicators used are as follows:

- GDP growth (Annual %)
- Gross saving (% of GNI)
- Unemployment (% of total labour force)
- Current account (% of GDP)
- Inflation (consumer price, annually)
- GDP per Capita growth in %

Models used for analysis are IS-LM-IP and AS-AD model.

Time frame of our analysis is from 2000 to 2017. The small span for analysis is taken due to data availability of different indicators on World Bank database. In addition, some selection of countries and indicators are considered on basis of data availability only.

The Euro Area Crisis of 2010: Analysis of Macroeconomic factors

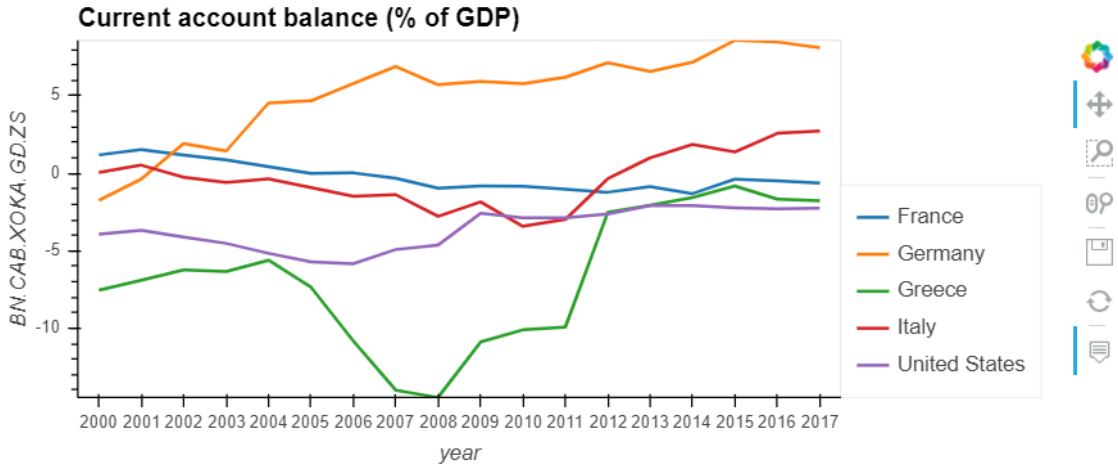
A Financial Crisis is a disturbance to financial markets, associated typically with falling asset prices and insolvency among debtors and intermediaries, which ramifies through the financial system, disrupting the market's capacity to allocate capital within the economy (Eichengreen and Portes, 1987). In the European crisis, several European countries experienced the collapse of financial institutions, high government debt, and rapidly rising bond yield spreads in government securities.

The Euro area crisis of 2010-12 was brought about by integration of countries with different economic, fiscal and monetary backgrounds into one currency zone. Before the crash, there was a credit finance investment boom, mainly from large capital flows within the euro area, from rich saving countries to countries in the European periphery with a history of default and fragile public finances at low interest rates (Brunnermeier 2019). This was due to no foreign exchange-rate risk with trade within the euro area and negligible perceived default risk. From the start of 2000 to the end of 2007, Germany and France ran a cumulative current account surplus (a measure of savings sent abroad) of euro 638 bn; Greece, Ireland, Portugal and Spain had a matching cumulative current account deficit of euro 668 bn (Brunnermeier 2019). This is clear in *Figure 1*, where a steep decline in Greece's current account is matched by an increase in Germany's. Most of this inflow was misallocated to non-tradeable sectors like construction which had low productivity and led to bubbles in those sectors.

The current account records a nation's transactions with the rest of the world—specifically its net trade in goods and services, its net earnings on cross-border investments, and its net transfer payments—over a defined period of time, such as a year or a quarter(Tuovila,2019).

A positive current account implies that the country is a net exporter of goods and services to the rest of the world, with payments made to foreign investors and transfers such as repayment of foreign aid while a negative one indicates a net importer of the same.

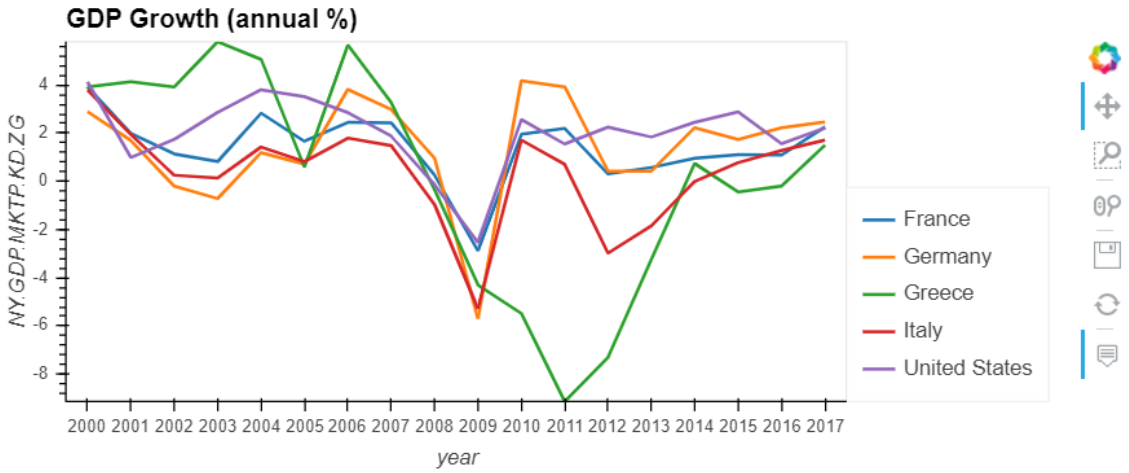
Figure 1: Current Account Balance (% of GDP)



The Financial Crisis has also led to contraction of the Gross Domestic Product of the United States and Eurozone countries. The GDP Growth (Annual %) indicator shows a rising rate of growth across all countries, with a wobble in 2005 and a slow down across the board coinciding with the start of the Financial Crisis of 2007-2008. Greece, which had been growing at a steady clip saw a reversal that saw it slide into negative territory, implying a contraction in GDP. The other countries saw negative growth, but for a shorter period before recovering.

The US subprime mortgage crisis of 2007 had led to losses in the American investments of European banks, leading them to cut interbank lending and buying of repos of securitized mortgages issued by countries in the European periphery. It also led to American money market funds to stop rolling over repos to European banks. This led to shocks in the supply of funds for bank funding in the Euro area leading to contagion from the US. While the core Eurozone countries recovered fast, the weak periphery Eurozone countries has their economies effectively contracting. The effects lasted longer because of the austerity measures imposed by lenders as pre-conditions for getting a bail-out.

Figure 2. GDP Growth (Annual %)

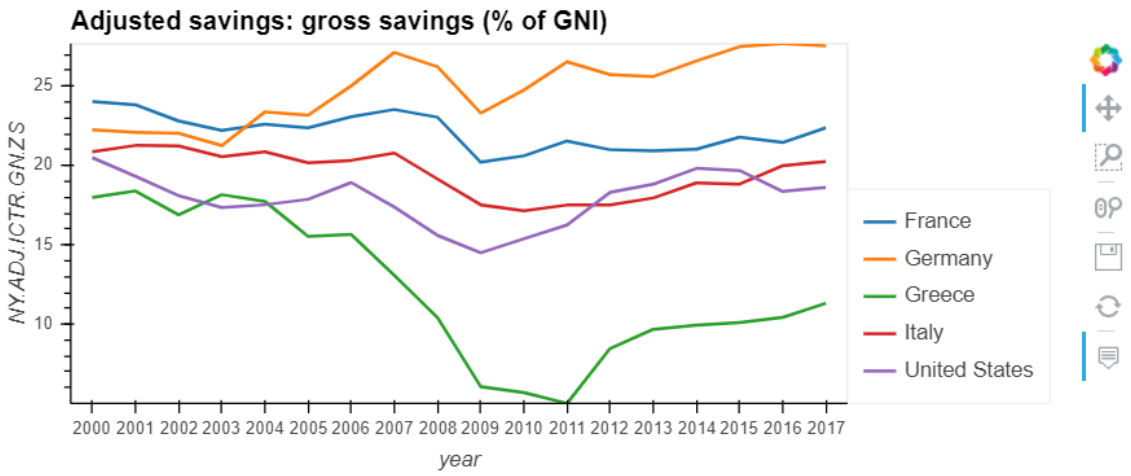


The Adjusted gross savings as a percentage of Gross National Income (GNI) also decreased more in the periphery more than the core of the Eurozone after the Financial Crisis. In *Figure 3*, Greece saw a bigger dip of adjusted savings than even the United States which was the epicenter of the Financial Crisis.

The UN methodology sheet(2008) defines the Adjusted net saving(ANS) as derived from the standard national accounting measure of gross saving by making four adjustments: (i) consumption of fixed capital is deducted to obtain net national saving; (ii) current public expenditure on education is added to account for investment in human capital; (iii) estimates of the depletion of a variety of natural resources are deducted to reflect the decline in asset values associated with extraction and depletion; (iv) deductions are made for damages from carbon dioxide and particulate emissions. The indicator is then computed by dividing ANS by GNI. The sheet also states that Adjusted net saving provides a measure of a country's sustainability by measuring the change in comprehensive wealth during a specified accounting period. In particular it provides a test to check the extent to which today's rents from a number of natural resources (i.e. change in natural capital) and changes in human capital are balanced by net saving (i.e. change in man-made capital), that is, this generation's bequest to future generations. From *Figure 3*, The decline in Adjusted Nest Saving shows the effect of the Financial Crisis of 2007-08

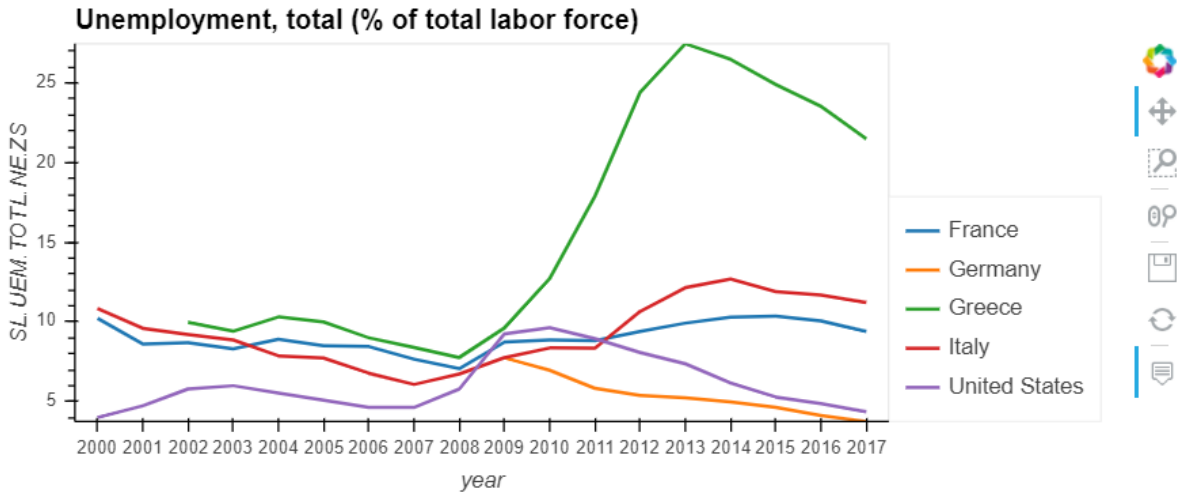
on Eurozone countries at around the same time that persisted longer in periphery countries like Greece and Italy.

Figure 3. Adjusted Gross Savings as percentage of GNI



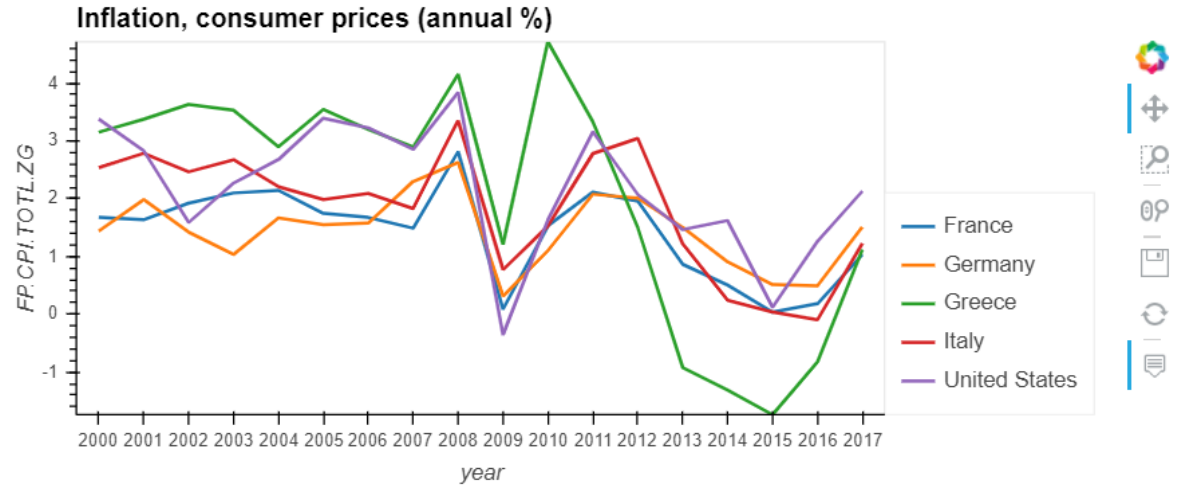
Bailouts from the IMF and other European creditors were conditional on Greek budget reforms, namely cuts to spending and increasing tax revenues. These austerity measures created a vicious cycle of recession, with unemployment reaching 25.4% in August 2012(Johnson 2019). This only served to weaken tax revenues further which made Greece's fiscal position worse and with reduced spending, made quality of life much worse with increase in homelessness and deterioration of public health. From *Figure 4,* there is a clear steep increase in unemployment in Greece that falls off later around 2013. Italy also show a less marked but nonetheless substantial increase in unemployment during the same period. On the other hand, Germany saw a reduction in unemployment during this time.

Figure 4: Unemployment (percentage of total labor force)



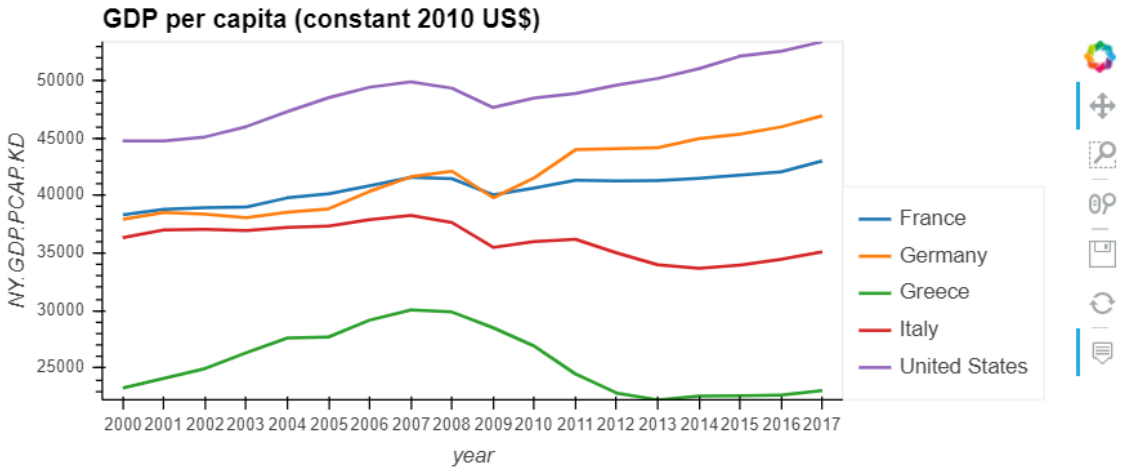
The shocks set off by the Financial Crisis of 2007 led to a fall of inflation as measured in terms of consumer prices as aggregate demand (a decrease in the total demand for goods and services). From *Figure 5*, this recovered before falling off again as the Eurozone crisis festered. A decline in aggregate demand typically results in subsequent lower prices. Causes of this shift include reduced government spending, stock market failure, consumer desire to increase savings, and tightening monetary policies (higher interest rates) (Investopedia,2019). Deflation can cause high unemployment (as in *Figure 4*) because when companies make less money, they react by cutting costs in order to survive the tough times.

Figure 5: Inflation (Consumer prices, annual percentage)



While all countries saw reduction in GDP per capita around 2007, it was slight in the core Eurozone countries of France and Germany but more in Eurozone periphery countries of Italy and Greece. In Figure 6, the reduction is biggest in Greece which saw its economy contract as it abided by the austerity measures and struggled to pay back loans from its creditors.

Figure 6: GDP Per Capita (constant 201 US$)

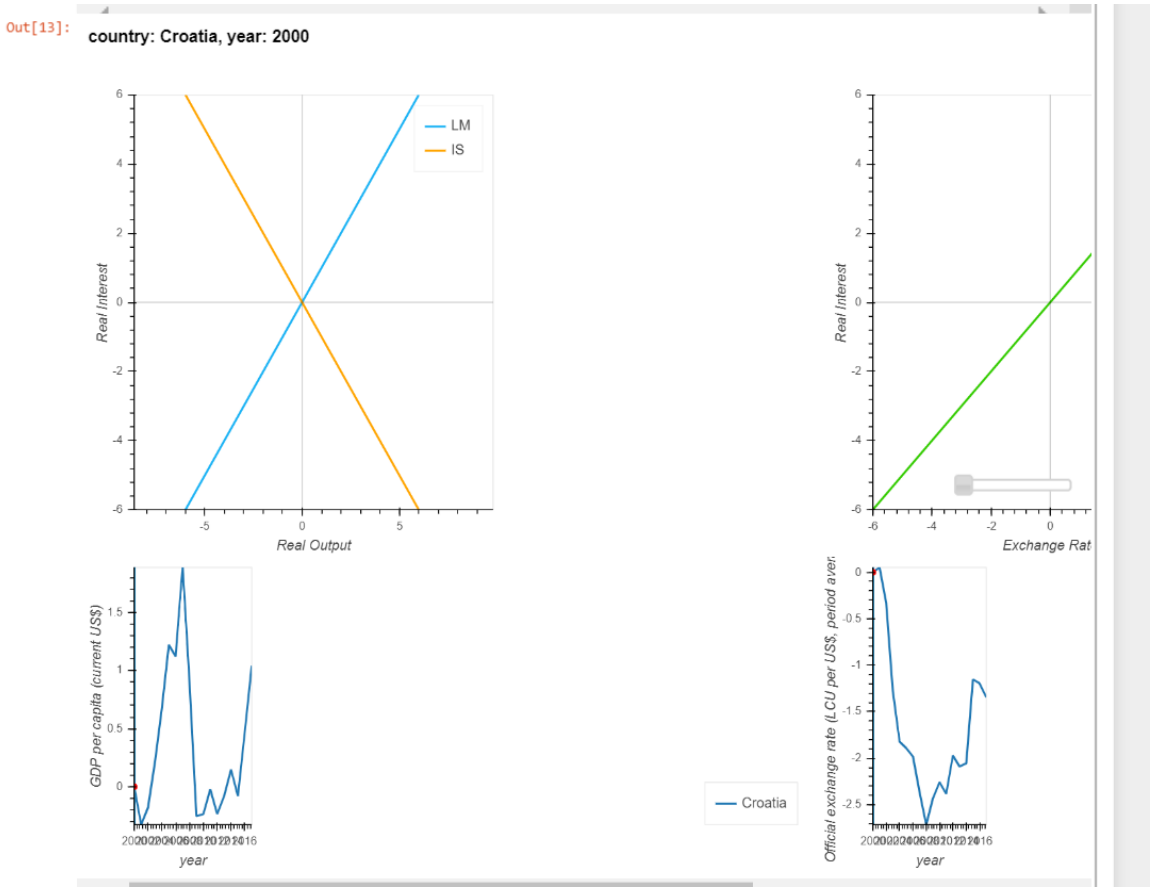


IS-LM-IP Model:

According to the class notes, "The IS-LM-IP model, aims to dissect key relationship between the goods (IS) and money (LM) markets, and their relationship to a country's real exchange rate (IP). The model can be defined according to three important relationships: Investment-Savings Relationship (IS), Liquidity-Money Relationship (LM) and the Interest-Parity Relationship (IP)".

From the class notes, "The IS Relationship serves as a simple decomposition of real GDP into government, consumers, investors and balance of payments. Using this decomposition, we can begin to dissect the role of a group in the economy and analyze their response to changing interest rates". Now coming to the LM Relationship, "it describes the effect real GDP has on real interest rates. As real GDP rises, more money is required in the economy to ensure people can meet their desired level of spending".

We have run IS-LM-IP model with different set of countries as compared to initial part. As there is data availability problem with our initial countries, we have chosen few European countries like Czech Republic, Sweden, Iceland, United Kingdom and Croatia. Below is output chart of IS-LM-IP model of one of the selected countries:



The LM Relationship describes the effect real GDP has on real interest rates. As real GDP rises, more money is required in the economy to ensure people can meet their desired level of spending. The IP curve is represented through a linear upward-sloping curve, defining the effect of changes in real interest rates on the exchange rate.

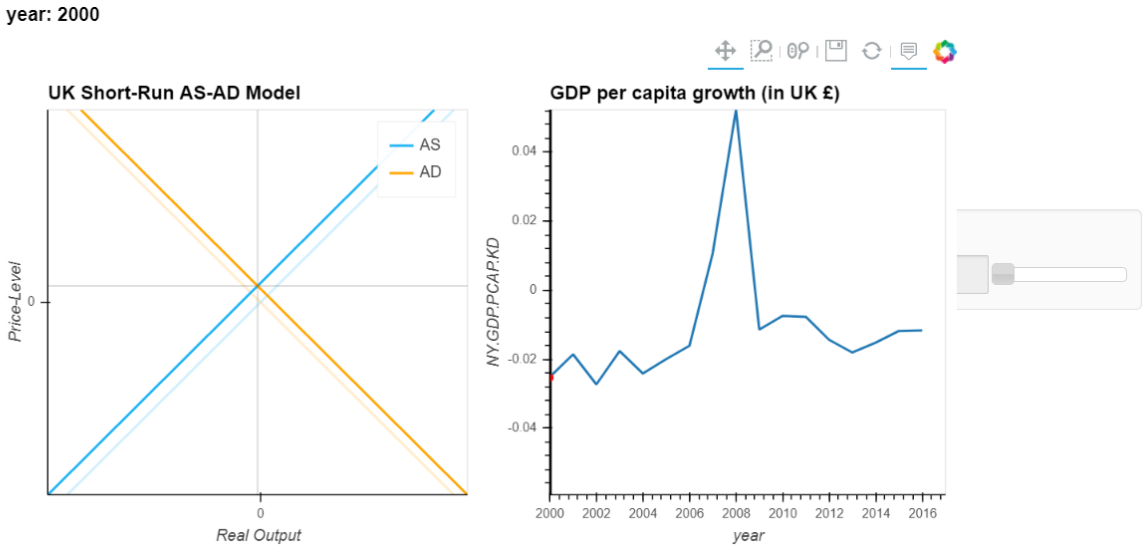
As per output chart, the economy of Croatia was hit during 2010. With the change in real interest rate in Croatia after 2010, due to interruption of government or force from European Union, GDP started increasing again and stability comes in exchange rate of country's currency.

AS-AD Model:

AS-AD model stands for Aggregate Demand-Aggregate Supply Model. From the class notes, "It considers the relationships between suppliers and consumers, which respond to price in producing or consuming an output. Unlike the microeconomic model, the AS-AD model tried to consider all markets in aggregate, rather than any particular market."

Below is the output of AS-AD model for United Kingdom (one of the selected countries).

Out[25]:



As it is clear from the output chart of AS-AD model for UK that price level and broad money has significant effect on GDP per capita growth of country.

Using the slider, we can see more of these exogenous shocks through time, as well as their effect on price-level and real GDP output. Using the real output set at 0 (equilibrium) between this price-level, we scale this equilibrium and compare it against our real GDP to analyze the validity of this model for use across a range of applications. Effect of Eurozone crises is clearly visible on UK through this chart. Steep decline of GDP per capita growth shows, UK also felt ripple effect from debt-burden countries. After seeing the output, we arrive at a conclusion around the effects of Monetary Policy on the real economy and capital markets.

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