

Seignorage: Past and Modern Exploitation

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ABSTRACT

This research will evaluate how countries struggling with common economic factors can rely on seignorage to boost their economies during a financial crisis or progress to become an emerging economy in a short period of time- the common factors faced by EU countries in the pre – Delor’s era that pushed them to resort to seignorage. We will then scrutinize the quandary caused and control tools used to curtail the predicaments caused by seignorage such as hyperinflation and currency devaluation. Furthermore, we will explore the benefits that can be created from effective utilization of seignorage such as ease of low-cost liquidity, healthy inflation, growth in GDP, employment, innovation, infrastructure and improved credibility of the local currency in the international foreign exchange market. In the end, we will explore how seignorage is a seraphic or atrocious tool for income generation for the local government in Pakistan.

Keywords: seignorage; hyperinflation; innovation; economic revival.

INTRODUCTION

“Seignorage is the right to mint coins”– (ECB, 2017). Seignorage, also spelt as seigniorage, is the variance in a country’s net revenue derived from the difference between the face value of a local currency and the cost of issuing it. For example, it costs approximately 10 cents to print USD 5, 10, 20 and 50 bills. While, USD 1 and USD 2 bills cost about 4.5 cents (Schneider, 2015). Therefore, the U.S. earns Seignorage of 95.5 cents per each USD 1 and USD 2 bills. For USD 5, 10, 20 and 50 bills, the Seignorage will be USD 4.9, 9.9, 19.9 and 49.9 respectively (Majasaki, 2019). A country’s dependence on seignorage and borrowing to generate profits leads to inflation and economic shocks – (Elkamel, 2019). In such countries, corruption and tax evasion are also prevalent. It also represents the misuse of public funds by local authorities. In this essay, we will discuss the role of seignorage during the period 1971 to 1991 in the European Union (EU) countries. Delor’s era (1985 – 1992) is considered as one of the most successful eras for European countries.

However, many EU countries struggled with local currency fluctuations, political instability and economic downturns before the advent of the glorious Delor’s era. The 1971 to 1991 timeline has been chosen as it represents how underdeveloped and developing countries struggled with key economic issues that are faced by many emerging economies even today. It will also observe how these countries came together to flourish as the EU in a short time-span of just 20 years. Seignorage was a popular income-generating tool for many EU countries during this time period. Thus, this research will evaluate how countries struggling with common economic factors can rely on seignorage to boost their economies during a financial crisis or progress to become an emerging economy in a short period of time. Lessons can be learnt from the past. We will first witness the common factors faced by EU countries in the pre – Delor’s era that pushed them to resort to seignorage. We will then scrutinize the quandary caused and control tools used to curtail the predicaments caused by seignorage such as hyperinflation and currency devaluation.

Furthermore, we will explore the benefits that can be created from effective utilization of seignorage such as ease of low-cost liquidity, healthy inflation, growth in GDP, employment, innovation, infrastructure and improved credibility of the local currency in the international foreign exchange market. In the end, we will explore how seignorage is a seraphic or atrocious tool for income generation for the local government in Pakistan.

LITERATURE REVIEW

To begin with, the profit a government makes to finance expenditures by issuing money is called the 'seignorage' – (Cambridge, 2020). History has witnessed most countries across Europe using seignorage as an income-generating tool in the past. It is a cheap source of revenue for numerous countries especially where there is widespread tax evasion. Although seignorage leads to higher levels of inflation there is a palpable difference in the rates of inflation for some of these EU countries over a longer period of time.

Reduced Cost of Finance

Seignorage is the cheapest source of revenue for any government. Unstable countries rely heavily on money creation to finance their public spending as compared to stable and homogenous countries. Political uncertainty handicaps the government to reach decisions and/ or enforce a particular policy. This increases the cost of tax collection. In such a situation, seignorage appended with tax smoothing becomes a more attractive and economical revenue-generating tool for the government. Tax smoothing is the alteration of tax rates when unpredicted shocks occur in the economy – Karakas (2014). Click (1998) studies EU countries' seignorage for the period 1970 – 1990 and concludes that seignorage is higher where the standard deviation of government spending is higher. For instance, during the 1970s Greece had an inflation rate of 15.8%, while her seignorage revenue was 14.6% of her total government income. However, in Turkey, the inflation rate was 33.6% during the same decade, even though its seignorage revenue was only 15.3% of its total earnings – (Cody, 1991).

In 2010, Pakistan's seignorage was about 1.1% of local GDP – Rao (2011). Since 2010, it has slowly increased coupled with innovation and tax smoothing. Pakistan's real GDP has also grown from 1.6% in 2010 to 5.83% in 2018 (CEIC, 2019). Her inflation rate declined from 13.88% in 2010 to 2.53% in 2015. By 2018, the inflation rate rose only marginally to 5.08% (World Bank, 2020). In 2019, Pakistan's GDP dipped to 3.33% given to the consistent decline in inflation and reduction in seignorage revenues but Plecher (2019) advocated that Pakistan's economic indicators have stabilized in the past ten years. Her consistent growth has transformed her into an emerging economy among the international markets.

Political Instability

Political instability is the propensity of a government to collapse due to rampant competition between various political parties within a country (Hussain, 2014). Political instability is quite harmful to economic growth as it gives rise to uncertainty and risk. Amplified variation in inflation rates in kingdoms with similar rates of seignorage revenue has been explained by Cukierman et al (1992). He reflects that the reasons could be political instability and polarization. Ambiguous political scenario augments risk and devalues the local currency. For example, when the Turkish lira devalued during the 1970s in the foreign exchange market, the country's creditworthiness was adversely affected. The Turkish government faced credit constraints in the international market and opted for money creation to finance its expenditures. Furthermore, Click (1998) observes that the use of seignorage by the central bank as a profit-generating tool is higher in urban countries where the central bank has greater independence. For example, Sweden's seignorage revenue was of 1.93% and while that of Italy was 7.42% during the same year. For countries

that are politically unstable and owe a large number of debts, implementation of Seignorage coupled with IMF relief funds stabilizes the local currency in the international market. Bohn (2019) emphasizes that monetary stability is particularly effective in heterogeneous societies with unstable governments.

Inflation and Hyperinflation

Creation of money also leads to soaring inflation rates – Sargent (1986). Inflation is the rapid increase in prices within an economy – Kenton (2019). Initially, this hyperinflation creates added income for the government but it can go out of control, called hyperinflation, causing currency devaluation and economic decline within a fiscal year. Seignorage can be very helpful if used only to earn a certain extent of revenue by the government. Sargent's (1986) school of thought recommends a combination of monetary and fiscal policies for the derivation of paramount economic benefits. For example, Portugal used seignorage to generate 48.48% of its total earnings during 1979 – 1988. However, it is interesting to note that Portugal's inflation index dropped from 18.56% to 17.69% during the same years; and its real growth rate remained stable. – (IFS, Table 6.1, Figure 6.2).

If there is gratuitous exploitation of seignorage, where the government issues unbacked fiat money which it has no intention of reclaiming through taxes, the market may get flooded with local currency, the consumer price index (CPI) will increase as the people have more money to spend and confidence in the central bank declines leading to hyperinflation. Case in point, Spain from 1973 to 1979, the government relied on money creation for 12.94% of its total revenue. Thus, Spain had a mounting inflation rate of 18.31% owing to Seignorage – (Cody, 1991). Spain also didn't build on any gold reserves. As such, Spanish Paseto devalued from 50.6 to 87.02 to 1 USD during this time, as reported by BoE – (Howes, 2019). On the other hand, in the case of Germany during the same period, the inflation rate was only 2.27% as the government used seignorage for generating only 3.28% of its total revenue.

In contrast, Ashworth et. al. (1998) exclaims that “tax smoothing considerations are insignificant elements in determining the behaviour of seignorage in developing countries”. Evidence exists which indicates that optimal taxation principles are not being used to levitate seignorage in the dominion of developing countries. Nonetheless, Trehan (1990) presented proof of co-integration between inflation and log of tax rate; with the assumption that distortionary costs of taxation and velocity of money should remain stationary but the velocity of money may never be stationary in the real world. Kenton (2019) argues that as such hyperinflation is rare in developed countries. One of the prime reasons for developed countries is that their seignorage doesn't exceed more than 18% of their GDP. Even so, Trehan's school of thought has captured a fascinating fact. Franklyn (2018) also provides significant data that inflation reached up to 50% per month in Zimbabwe in March 2007. Zimbabwe's central bank introduced Seignorage but did not bother to implement any control tools (Chart 1) to restrain the resulting inflation. By June 2008, her monthly inflation rate exceeded 2,600% resulting in hyperinflation. In 2009, Zimbabwe's economy entered a recessionary phase and the local government switched to dollarization to stabilize the local economy.

Local Currency Fluctuations

Seignorage and escalating inflation rates also discourage the use of local currency in the foreign exchange market. Hence, many governments peg their local currency with the dollar to stabilize its value. During the 2007 – 2009 recessions, USD remained unstable. As a result, political leaders of the emerging economies such as India, China and Russia questioned the domination of dollar currency in universal trading and national reserves – (Deen, 2009). Dollarization may not always be in the best interests of a developing nation. In such a scenario, seignorage costs would be paid to a foreign country to import high powered money. Fischer, 1982, calculated that “cash flow cost is typically about 1% and the stock cost is about 10%

of the country's Gross National Product (GNP)". Canzoneri (1990) used Lucas and Stokey's cash – in – advance model to evaluate optimal tax versus the cost of multiple currencies in the EU. He defines the EU as the optimal currency area where the EU's policymakers are able to weigh credibility along with valuation and currency conversions costs. They introduced a common currency, Euro, to encourage trade and also reduce inflationary bias among European nations.

Moreover, Botazzi et. al. 2002, believes that lack of commitment in the redistribution of seignorage leads to excessive inflation and suboptimal taxation in the common currency areas. This commitment of redistribution is also referred to as the control tools (Chart 1). Thus, ECB Statutes ordain EU countries to redistribute seignorage on the basis of fixed parameters that are "truly" exogenous and cannot be easily manipulated by individual member countries. Nonetheless, the inflation tax is seen as an essential part of the government's optimal taxation program – Doerfler (2001). Pakistan's government of 2013 – 2017 used Seignorage as a source of income to boost Pakistan's local economy. State Bank of Pakistan (SBP) had plans of introducing 10,000 rupee notes too – (Ahmed, 2016). Political stability was still an issue at that time due to various 'dharnas' and other political rallies. In 2014, USD rose steadily from PKR 97 to PKR 105 per USD. During 2015 to 2017, though SBP consistently made use of Seignorage; but PKR remained stable (about PKR 100/USD). One of the prime reasons was the rise in taxes during this period.

Revival of Economic Activity

During a fiscal deficit, the government eases liquidity in the local market through seignorage. Liquidity leads to inflation and revival of economic activity in the country – (Agnello, 2011). The rise in nominal inflation may be controlled through adjustments in the interest rates set by the central bank. Bordo (1993) submitted a model which states that levels of stock money construe performance of nominal economic variables during the transitory suspension of convertibility. In spite of the usefulness of Bordo's model, its simplifying assumptions limit its application in the real world. However, inflation may be controlled and benefits from seignorage may be maximized if the country's central bank starts by first reducing nominal balances below the level entailed by the gold standard in the international market.

Denmark, Ireland and the UK joined the European Economic Community (EEC) in 1973 for boosting their local economies and improve bilateral trade relations with developing European countries. EEC consisted of six countries only at that time. These countries were France, Germany, Italy and the three Benelux countries. Greece, Spain and Portugal followed suit to join EEC in 1977. In this era, countries such as Spain and Portugal had been foremost in using Seignorage to advance their economies and become eligible for joining EEC. Other EEC members were thought that Seignorage, being a short – term solution, did not imply a stable and growing economy. Consequently, the EU parliament was designated to check the sources of income for all EEC member countries and provide financial guidance to new EEC member economies – ECB (2002).

EU economic restoration was already visible in the EEC member countries but the heads of states were sceptical. First EU elections were held in 1979 as the country heads considered that proper economic policies had to be formulated according to the wishes of all EEC member states. The 1973 directive, or First Council Directive, offered coordination of laws, regulations and administrative provisions to the EU parliament relating to the taking-up and pursuit of the business and direct insurance in EEC member states. Not long after that, there have been suggestions for the application of conservative monetary policy enticing minor governments with lesser taxes and smaller inflation rate. Liberal monetary policy has also been suggested for bigger Governments with vast taxes and controlled inflation for optimal utilization of seignorage. Mankiw (1987) observed that nominal interest rate and inflation positively co-vary with government receipts as a percentage of the country's GNP. Dogru (2016) has also tested Mankiw's theory

with vector error correction method (VECM) for the Turkish economy during the period of 1980 till 2011. He verified that Seignorage gives a boost to the local economy in the short run. GDP rises with an increase in employment rates. However, in the long run, casualties from hyperinflation affect the local currency in the international market.

Innovation

Seignorage also leads to innovation in the state's economic sectors. Innovation comes on the heels of failure – Cocoran (2019). Dornbusch (1990) offers substantial evidence on financial innovation as a product of seignorage and hyperinflation. Gregorio (1991) supporting Dornbusch's school of thought reflected that reduction in the cost of inflation equals to financial innovation. Fresh agencies arise which allow people to earn additional income on their money holdings. Innovation in the economy may be attributed to levitation in knowledge, entrepreneurship, technology, infrastructure etc. Innovation creates a permanent shift in the money demand function of a country. In time, inflation falls back to lower levels but money demand function remains unchanged – (Easterly et. al., 1995). Many financial entities incorporated from 1973 to 1979 to bridge gaps in the struggling economies and changed the face of business industry in Europe. However, this rise in financial industry innovation remained unnoticed Dornbusch (1990).

Many academic scholars feel that seignorage may be useful as a short term solution only. Arrau et al. (1991) suggest that countries with more variable rates of inflation experience larger shifts in the money demand function. The large shifts lead to economic uncertainty and hyperinflation. Citizens then insist on government involvement or avant-garde financial instruments to preserve the value of their savings in the face of an economic recession. Burdekin (2011) reflects Seignorage coupled with that lack of innovation could also handicap the local economy. For example, Hongkong and Argentina both pegged their local currency to the USD while making use of Seignorage. However, Argentina's link with USD collapsed in 2001 due to lack of innovation in the economy. While HKD remained stable against USD to date due to the country's higher innovation index. Thus, governments are reluctant to use seignorage as a viable solution to finance a majority of their budget with it. To effectively use Seignorage, she may adjust interest rates, reduce nominal economic variables or issue backed fiat monies, which she plans to recover through taxes laid out over a certain time period. This is also referred to as tax smoothing (Karakas, 2014). It would ultimately control hyperinflation or may even result in disinflation! Thus, seignorage may prove to be a seraphic tool for income generation for the local government if it is implemented wisely.

RESEARCH METHODOLOGY

The scientific approach to solving a research problem is called research methodology (Kumar, 2011, p.5). It may include identifying a particular academic area of interest, selecting a unique topic, conducting extensive literature surveys, preparing the research design, collecting facts and figures, analyzing data, testing hypothesis, generalizing, interpreting, formally reporting the conclusions and providing recommendations. The following research methods have been selected for this study. The authors have mainly used case studies of EU countries, Sweden and Turkey with an enhanced focus on UK, Germany, Spain, Belgium, Denmark, Greece, Italy, France, Portugal, Ireland and Netherlands. This is a qualitative research study of the reasons behind the adoption of Seignorage as a revenue-generating tool for each country in the EU. This scholarly research also aims to capture the genuine essence of how Seignorage affects the economy with respect to the liquidity, fiscal deficit, currency valuation and inflation.

Desk research is a means of gathering some or all of the required data from the convenience of a desk. Therefore, desk research is perfect for collecting background information, information on countries' economic indicators - (Birn, 2004, p.19). Thus, desk research has been carried out to collect information on

what literary scholars and economists believe about how benefits of Seignorage may be harnessed for developing economies like Pakistan. Cyberspace search engines have been the major source of information collection. A number of databases including Springer, Google Scholar, Harvard Business Review, Financial Times and Bloomberg etc. were consulted. A number of internationally recognized academic journals in economics have also been referred to in this study.

Intellectual guidance of my academic professors has an indispensable effect on the foundations of this research project. Discussions with pedagogic colleagues and scholastic students also provided constructive insights in augmenting my comprehension of ideologies presented by prominent scholars and managing stressful timescales. Creative ideas from my industry colleagues also have a profound influence on this thesis. The libraries and their resources are a hub of invaluable information. A number of books and e-journals on the subject of Seignorage have been taken into account. Although all the books consulted primarily deal with different countries and different universities; keeping in mind the global aspect of current business industry, these books should prove to be helpful in establishing an outlook for this thesis. Exclusive opinions, of politician and finance professionals, have also been noted from newspapers, newsletters, academic journals and latest TV interviews.

Research Outcome

To encapsulate, a seignorage is an inexpensive and attractive revenue-generating tool for the government during a liquidity crunch used as a sporadic short term solution for bridging gaps in the fiscal deficits of the country's economy – [Ashworth (1998); Bordo (1993)]. It is more suitable for countries which are politically unstable, have a devalued local currency and have elevated costs of tax collection and/ or where there are widespread tax evasions – [Elkamel (2019); Cukierman (1992)]. Countries facing international credit constraints may also use seignorage to temporarily ease liquidity in their local economies. The major drawback for using money creation is the upsurge in inflation rates, which we also refer to as hyperinflation – Dogru (2016). Hyperinflation adds revenue to the country's GDP and eases liquidity in the local market – Agnello (2011). On the other hand, seignorage also devalues the local currency in the international foreign exchange market. This hyperinflation continues to mount if appropriate measures are not implemented by the government to control its intensification – (Karakas, 2014; Burdekin, 2011).

DISCUSSION

We have witnessed various examples of EU countries that experienced bouts of hyperinflation as a result of resorting to seignorage for financing its government spending. If the central bank relies heavily on seignorage to generate most of its profits, the cost would be disastrous for the nation's economy. The price level in the country will increase to bloated levels adversely affecting local CPI Index – [Click (1990); Rao (2011)]. Also, the credibility of the local currency will decline in the international foreign exchange market. As a result, people will purchase foreign currency or gold to protect their savings from losing value. The government may have to resort to dollarization to maintain the value of their local currency in the global market – Dogru (2016). This, in turn, will reduce the authority of the central bank and increase dependency on foreign governments. Nevertheless, we also have examples among EU countries where high levels of seignorage that resulted in minimal ascent in inflation rates! – (IFS, Table 1, Figure 1 and Figure 2) given in Appendix A. Eminent economic scholars have presented various models to explain the optimal synchronization of seignorage and stabilize the country's economic variables – [Mankiw (1987); Botazzi (2002); Trehan (1990)]. In light of these scholarly discussions, Chart 1 expounds upon the 'factors' that instigate the implementation of seignorage, 'tools' for how to control hyperinflation and its possible 'outcomes' alongside utilizing the benefits of seignorage too.

In the event of an economic recession, there are typical factors that arise and hinder economic growth. These factors are most commonly political instability, international credit constraints, devalued local currency and profligate tax evasions. These factors create a fiscal deficit in the nation's target GDP – Elkamel (2019). Such circumstances encourage the government to resort to internal resources like Seignorage, as shown in chart 1, and replenish the widening gap between its expenditures and revenues.

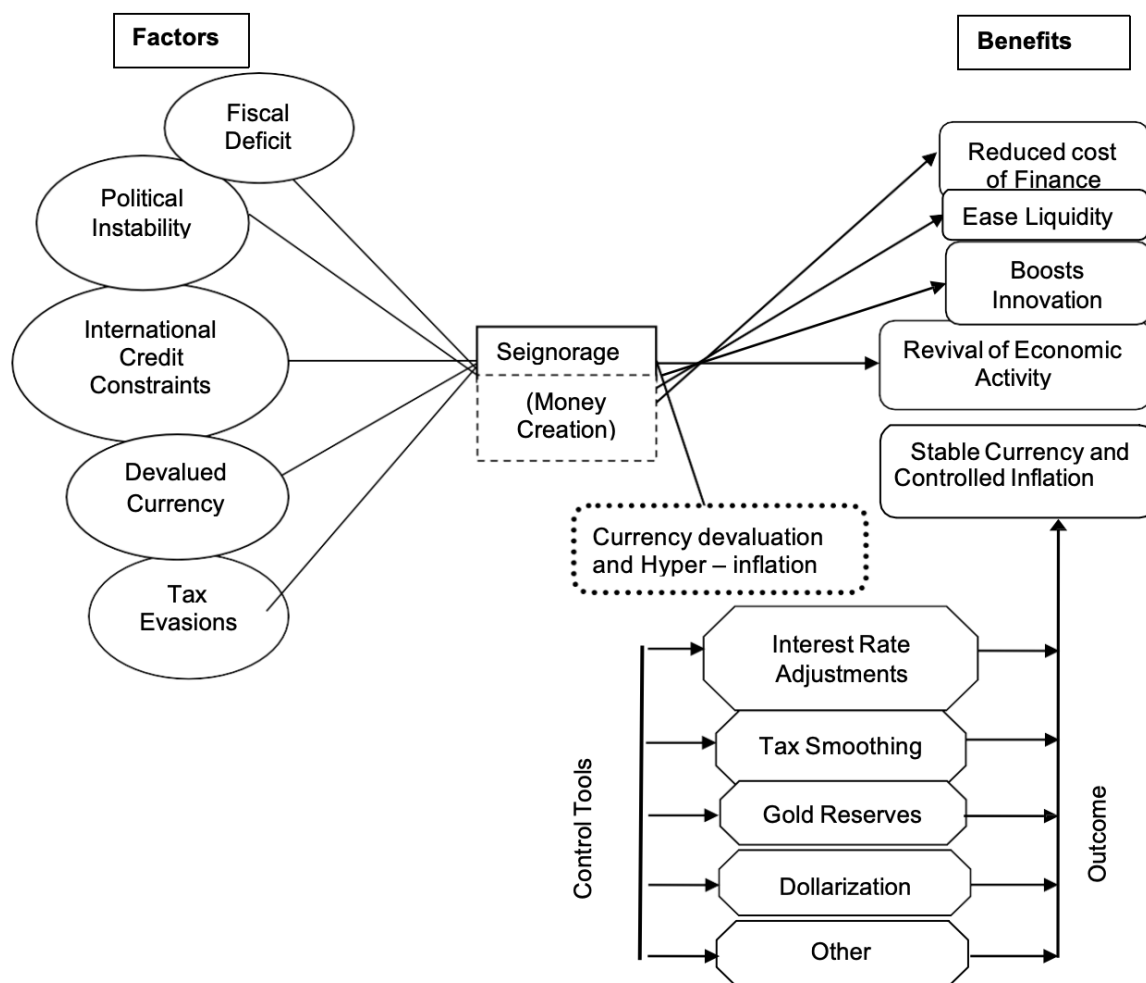


Chart 1: Synchronizing Seignorage

Seignorage creates extra monies, which ease liquidity, boosts innovations and revive economic activities in the country – [Mankiw (1987); Dogru (2016); Burdekin (2011)]. Money creation circulates liquidity in the market. Innovation shrinks the fissures of the local market. Economic pursuits rejuvenate as a product of ease of access to money and direct innovation – [Easterly (1995); Dornbusch (1990)]. Many innovative products and entities have been pioneered in the international market as a result of the 2009 global recession. Availability of foreign trade opportunities and investments is often low when the economy is experiencing a recession. Seignorage boosts the revival of economic activities, as depicted in chart 1, and brings the economy in equilibrium at a reduced cost – Gregorio (1991). IMF allows access to foreign aid to low-income countries. However, these loans come with payback plans, interest rates and undeniable conditions

that may reduce the government's control over its local economy. Nonetheless, small countries can utilize domestic solutions like Seignorage along with foreign aid to reap superior benefits – Bohn (2019). Seignorage also devalues the already undervalued local currency and hauls hyperinflation. These negative spin-offs can be controlled through a number of monetary and fiscal policy tools, as illustrated in chart 1. To stabilize the local currency in the local and foreign exchange market, the government may adjust the interest rates (Federal Fund Rate, Federal Discount Rate, Reserve Requirement Ratio etc) while seeking IMF relief funds.

The interest rates are highly sensitive rates that quickly change the structure of the circulation of money in the economy. They also have a ripple effect, termed by economists as the money multiplier effect. The injection of relief funds from IMF appended with interest rate cuts and revenue from seignorage stabilizes the local currency in the foreign exchange market – Bohn (2019). The government may decide upon tax smoothing to curb on hyperinflation and maintain the value of the local currency in the international market – [Karakas (2014); Doerfler (2002)]. This is not a well-received policy among commercial banks and local businesses. The escalation in taxes, even if its payment is spread over a certain time period, eats up the firm's profits. Businessmen often join non-profit foundations and unions to voice their complaints to the government and protect their firms against bloated taxation and harsh government policies.

Alternatively, the government may build upon its gold reserves; or switch to, other valuable resources, such as oil, platinum, precious gemstones, historic and intellectual capital, digital resources etc – Franklyn (2018). The fortification in innovation and technology after the 2009 global recession has fashioned several options for the governments of struggling economies. For instance, Goldman Sachs used financial derivatives to successfully acquire its competitors' firms and avoid being taken – over during the 2009 global crisis. Germany has been optimizing on intellectual capital to maintain its currency value. A government may also opt for a more expensive approach, like dollarization but the leadership of USD has been under scrutiny by many country heads lately – Deen (2009). Kuwaiti Dinar, Omani Riyal, UK pound sterling and Bitcoin have emerged as the most prized currencies of the 21st century. Swiss Franc, Euro and Chinese Yuan are also considered strong and highly stable currencies in the international foreign exchange market. There are many choices but each country may prefer to peg their local currency as per their trading needs. Hyperinflation is the most prominent negative spin-off resulting from Seignorage – Elkamel (2019). It augments uncertainty and risk in the home country economy. It destabilizes the CPI, devalues the local currency and people's savings start to lose value. In spite of these disadvantages mentioned above, Seignorage has several advantages too. Hyperinflation, resulting from money growth, forms an integral part of government earnings. It cultivates new financial entities, boosts innovation and abets economic growth – Burdekin (2011). Yet, it is essential that hyperinflation is controlled before it spawns too much damage to the local economy – Botazzi (2002). The government may use any or a combination of control tools, as reflected in chart 1, to oppress this so-called hyperinflation and currency devaluation.

RESEARCH IMPLICATIONS

Theoretically, this research incorporates Mankiw's (1987) tax-smoothing framework and monetary theory to effectively synchronize the concept of Seignorage in the economy. Monetary theory suggests that in times of hyperinflation, value of local currency diminishes; which leads to increased demand of foreign exchange and/or gold. Chart 1 uses these monetary controls to circumvent the negative impact of hyperinflation; which is also a by-product of seignorage. This facilitates the economy to resolve their liquidity crisis on a short-term, quick fix basis, while avoiding hyperinflation. Practically, Mankiw's (1987) tax-smoothing framework co-integrates tax rate and inflation rate and redirects the excess cash flow generated by seignorage back to the government. It effectively negates the consumers from over-spending

and drives the labor market to boost productivity and exports. The exports, in turn, attract foreign exchange and stabilizes the local currency in the forex markets abroad. However, implementation of this research requires governments to maintain strict targets of money generation, tax rates, productivity and exports within the economy through a combination of any of the listed control tools in chart 1. Otherwise, the local economy will experience bouts of hyperinflation and of hyper-deflation. For future research, academic scholars may devise a mathematical framework to quantify this research.

CONCLUSION

To conclude, Seignorage has been a notable source of income for many countries across Europe during the early days of the EU. It has been repeatedly used by developing countries to target inflation and generate revenue at a lower cost when their economies are shrinking. However, developed countries disparage seignorage as a chic source of revenue; therefore, it remains only a small part of their local revenues. Pakistan's economy may not be going through a recessionary phase at the moment, but the government may contemplate other inexpensive and viable sources of income for the country. Pakistan is prone to widespread tax evasions, recurring terrorism threats and devaluation of PKR in the foreign exchange market. Rather than opting for soaring taxes and fancy IMF deals, the Prime Minister may look into how to utilize low-cost avenues and methods to restrain existing inflationary gaps in the domestic economy.

This research is a significant contribution to the field of financial economics. It helps us understand how seignorage may be utilized by the government with its alluring benefits such as reduced cost of finance, the revival of economic activities, financial innovation etc., as demonstrated in chart 1. It also helps the government circumvent imminent dangers caused by seignorage such as hyperinflation, local currency devaluation and uncertainty in the market. Excessive gold reserves sought by any government lead to bubbles in the gold exchange market. In further studies, researchers may examine other precious materials as alternatives for safeguarding the value of the local currency in the international foreign exchange market. These precious materials may include oil, platinum, rare stones or even knowledge incubators that lead to financial innovation and socio-economic prosperity. Academic scholars may also ponder upon the exact ratio of optimal seignorage in the country's budget. They may inspect how innovation may be harnessed through the use of seignorage to maximize socio-economic benefits. In the end, researchers may compare seignorage with other low-cost alternative solutions that governments could use during a fiscal crisis.

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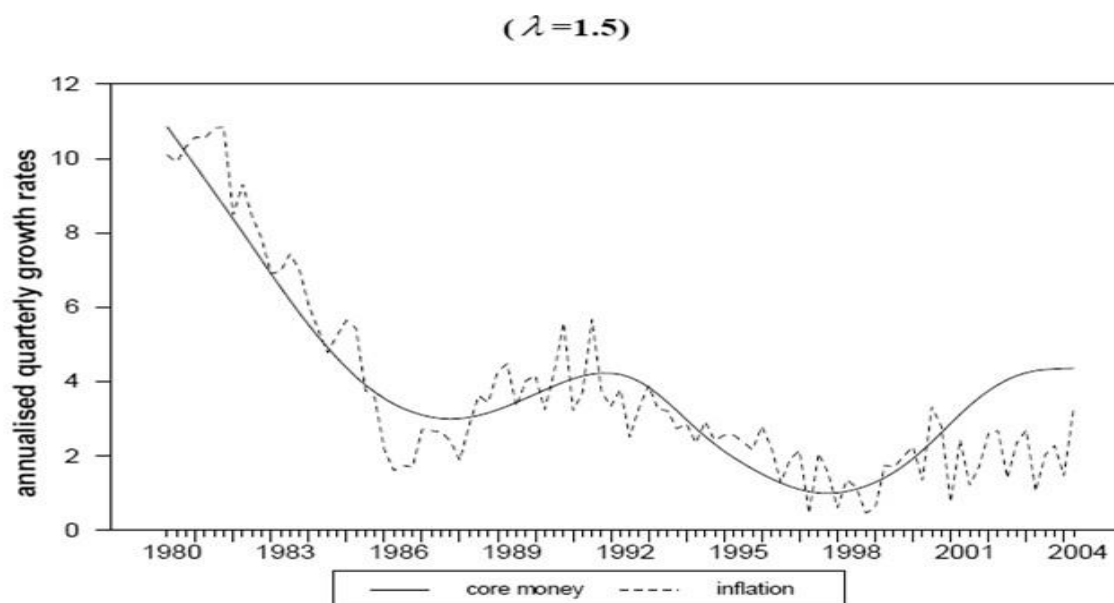
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Appendix A

Table 1. Seigniorage, Inflation and Growth in Europe (1973 – 1988)

Country	1973 – 1979 [Former]			1979 – 1988		
	GNP [GDP]		Seigniorage	GNP [GDP]		Seigniorage
	Real Growth	Inflation	% of Total	Real Growth	Inflation	% of Total
	(%)	(%)	Revenue	(%)	(%)	Revenue
Belgium	2.56	8.49	3.10	1.57	4.57	0.56
Denmark	1.88	10.51	0.82	2.19	7.24	16.11
France	2.30	11.35	1.07	1.93	8.08	4.66
Germany	2.27	4.89	3.28	1.88	3.11	3.00
Greece	4.88	14.30	11.84	4.25	16.19	16.24
Ireland	4.66	14.97	6.74	2.23	10.54	7.52
Italy	2.97	17.27	14.56	4.15	5.33	9.00
Netherlands	2.76	7.97	1.33	1.34	2.84	1.30
Portugal	4.31	18.56	13.27	4.32	17.69	48.48
Spain	3.26	18.31	12.94	1.42	12.30	13.54
UK	1.82	16.11	2.30	1.85	8.46	5.51

Source: International Financial Statistics (IFS)



Source: Economic Research Centre

Figure 1: Core money and inflation

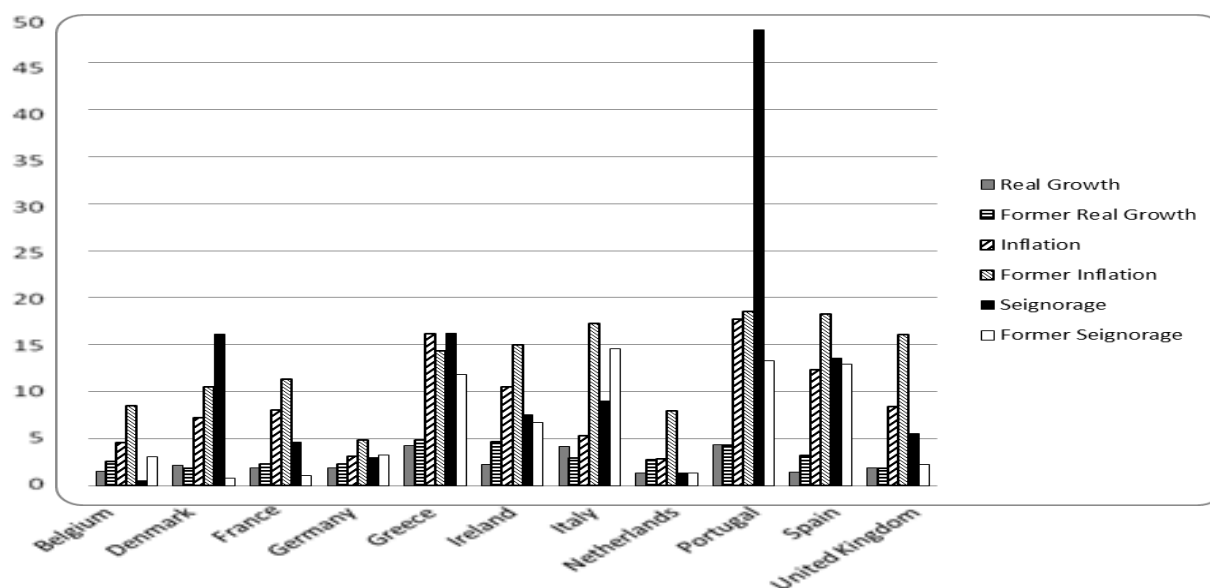


Figure 2. Seignorage, Inflation and Growth in Europe (1973 – 1988)

Appendix B

Abbreviations

BoE	=	Bank of England
CPI	=	Consumer Price Index
ECB	=	European Central Bank
EEC	=	European Economic Council
EU	=	European Union
GDP	=	Gross Domestic Product
GNP	=	Gross National Product
IFS	=	International Financial Statistics
HKD	=	Hong Kong Dollar
PKR	=	Pakistani Rupee
SBP	=	State Bank of Pakistan
UK	=	United Kingdom
US	=	United States of America
USD	=	United States Dollar