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The effectiveness of Qard-al-Hasan (interest free loan) as a tool of monetary policy

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Abstract

Purpose – This paper aims to investigate the macroeconomic effects of Qard-al-Hasan (QH) as a tool of monetary policy (MP) and its effectiveness in achieving full employment and price stability in the economy.

Design/methodology/approach – QH-based MP and its effects on major macroeconomic variables are examined on theoretical ground by using the standard aggregate output and aggregate expenditure model within the framework of Islamic economic principles.

Findings – QH-based MP positively influences real sectors of the economy and increases output, and the economy returns to full employment. QH provides the lowest possible borrowing costs across the economy and thus triggers rightward shift in aggregate supply curve and thus increases output and lowers price level. In addition, increase in output eliminates excess demand or shortages and thus maintains price stability. Furthermore, QH-based MP also increases exportable surplus and exports, decreases imports as well as increases inflow of funds and foreign currency reserves with the Central Bank and thus makes MP more effective.

Research limitations/implications – QH-based MP is usually expansionary MP, and as such, it can be argued that there is a probability that QH-based MP may lead to higher inflation rate. However, in this study, it has been shown with real world data in Table II, that 23 countries in Group 1 have pursued zero or negative interest rate policy and their experiences mitigate such probability.

Originality/value – This is, perhaps, the first paper that presents a complete model of QH as a tool of MP with fully explained transmission mechanism. This is new contribution in the literature of Islamic finance where theoretical model on QH is systematically developed and applied as an effective tool of MP in attaining full employment and price stability. This model of QH-based MP can unfold a new horizon of uninterrupted economic growth, full employment and price stability by increasing output and employment, as well as by eliminating excess demand or shortages.

Keywords Islamic banks, Qard al-Hasan

Paper type Research paper

1. Introduction

Monetary policy (MP) is one of the most important tool by which Central Bank (CB) plans to maintain full employment and price stability. In conventional interest-based system, CB uses bank rate and other interest related MP instruments. In Islamic or *Sharia-compliant* system, different non-interest related tools are used. In this paper, Qard-al-Hasan (QH), often translated as goodly loans or beautiful interest free loans will be used as tool of MP for achieving full employment and price stability. The impact of QH-based MP in the economy is absolutely overwhelming, not only because QH is interest free but also QH is blended with compassion and an eagerness of the lenders to alleviate the sufferings of the borrowers so that the borrowers may succeed in deriving the maximum possible benefits from such loans.

JEL classification – E52, E58, F42, P51

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The word Qard is an infinitive word which means cutting off. In this QH contract, the lender instead of taking more like *riba* or usury, in fact, the lender may give part of the property graciously or will take less. Islam has prohibited *riba* or usury but encourages QH. QH is an interest-free loan and designed to help alleviate the sufferings of those who are in need.

QH is mentioned several times in Quran, the revealed words of Allah, may He be exalted. Often QH is mentioned as the loans to Allah, may He be exalted. Loans to Allah refers to giving interest free loans to those who are desperate in need for the love and seeking the pleasure of Allah only. Loans to Allah could be lending for the love of Allah for a specific period, or forever, and the person will collect the gracious and handsome rewards from Allah, may He be exalted, on the Day of Judgement when the rewards will be multiplied many times.

As mentioned above, the owner of the QH funds may extend the loan for a given period or, may lend forever, as Allah, may He be exalted, says in the Quran:

> Who will loan Allah a goodly loan so that He may multiply it for him many times over? And it is Allah who withholds and grants abundance, and to Him you will be returned (Qur'ān, 2:245).

In Sura Hadid, it is mentioned that:

> Indeed, the men who practise charity and the women who practise charity and (they who) have loaned Allah a goodly loan – it will be multiplied for them, and they will have a noble reward (Qur'ān, 57:18).

Also, in Sura Hadid, it is mentioned, "Who is it that would loan Allah a goodly loan so He will multiply it for him and he will have a noble reward? (Qur'ān, 57:11). In Sura Muzammil, Allah, may He be exalted, asked us to give goodly loan in addition to Zakat or poor due as it is mentioned:

> Establish the salat and pay the zakat, and give to Allah a goodly loan. Whatever good you may send forward for yourselves, you shall find it with Allah. That is best and richest in reward. Seek forgiveness from Allah; indeed Allah is All-Forgiving, All-Merciful (Qur'ān, 73:20).

Abu Rafi', may Allah be pleased with him, reported that the Prophet, may the blessings and peace of Allah be upon him, had borrowed a young female camel from someone and when he received zakat of camels, he ordered me to send a young female camel to the man as settlement of the loan. I said to him, "I could not find among the camels except a female camel which is ready for pregnancy." The Prophet, may blessings and peace of Allah be upon him, said, "Give it to him, indeed, the good person among you is he who settles loan with something better" (*al Muslim*, Hadith No.1224/3, Kitab Musaqah 22, Bab man istaslafah shayan. See also *al-Muwatta of Imam Malik*, Vol. 3, Book 47, Number 777). It is reported that the Prophet, may blessings and peace of Allah be upon him, said: "in the night of the journey, I saw on the gate of heaven written, "reward for *Sadaqah* (deeds of charity, alms) is ten times and reward for Qard is eighteen times." So, I asked the angel, how is it possible? The angel replied, "Because beggar who asked had already had something but a borrower did not ask for loan unless he was in need." (*Ibn Hisham and Ibn Majah*). In another hadith reported by Abu Hurairah, may Allah be pleased with him, the Prophet, may blessings and peace of Allah be upon him, said, "Whoever relieves a believer from a difficulty in this world, Allah will relieve him from his difficulty and Allah will facilitate him in this world and world hereafter" (*al Muslim*).

QH was introduced and practised during the life time of Prophet Muhammad, may blessings and peace of Allah be upon him, and he used QH, repaid the borrowed amount back to the owner and supplicated graciously for the owner as it is clear from the following

hadith. Isma'il bin Abi Rabi'ah Al-Makhzumi, may Allah be pleased with him, narrated from his father, from his grandfather, that the Prophet, may blessings and peace of Allah be upon him, borrowed 30 or 40 thousand from him, when he fought at Hunain. When he came back he paid the loan, then the Prophet, may blessings and peace of Allah be upon him, said to him, "May Allah, may He be exalted, bless your family and your wealth for you. The reward for lending is repayment and words of paradise." (*Sunan Ibn Majah*, Vol. 3, Book 15, Hadith No. 2424).

The concept of QH can be used as a tool of MP. If CB replaces bank rate with QH and gives goodly loans without any interest then it is expected, it will be expansionary monetary policy (EMP) and, as such, EMP will create the maximum possible positive effects in the economy. QH is one of the easiest ways to change the supply of money in the economy. QH can be defined as goodly loans and often given without any stipulated or unstipulated expectations for return or interest. The owner of the capital lends QH funds with the pure expectations of receiving the rewards from the Creator and Sustainer of the Universe than any monetary returns.

Giving loan may increase rewards in multiple stages. Prophet, may blessings and peace of Allah be upon him, said, "There is no Muslim who lends something to another Muslim twice, but it will be like giving charity once." (*Sunan Ibn Majah*, Hadith no. 2430). Not only that, Prophet, may blessings and peace of Allah be upon him, said:

> Whoever gives respite to one in difficulty, he will have (the reward of) an act of charity for each day. Whoever gives him respite after payment becomes due, will have (the reward of) an act of charity equal to (the amount of the loan) for each day. (Sunan Ibn Majah 15:2418).

Prophet Muhammad, may blessings and peace of Allah be upon him, said, "Once a man died and was asked, "What did you use to say (or do) in your life time?" He replied, "I was a businessman and used to give time to the rich to repay his debt and (used to) deduct part of the debt of the poor." So he was forgiven (his sins)." Abu Masud, may Allah be pleased with him said, "I heard the same (Hadith) from the Prophet, may blessings and peace of Allah be upon him." (*al Bukhari* 3:41:576). The loan must be given without having any worldly service or interest from the debtor. Taking interest is declaring war with Allah and his Messenger, may blessings and peace of Allah be upon him. *Riba* or interest is prohibited as mentioned in Quran: "Those who devour *Riba* (interest or usury) will not stand (on the Day of Resurrection) except like the standing of a person beaten by *Shaitan* (Satan) leading him to insanity. That is because they say, "Trading is only like *Riba*," whereas Allah has permitted trading and forbidden *Riba*. Therefore, whosoever receives an admonition from his Lord and stops devouring *Riba*, for him is what is in the past; his case is for Allah (to judge); but whoever returns (to *Riba*), such are the dwellers of the Fire – they will abide therein forever. Allah will destroy *Riba* and will give increase for *Sadaqat* (deeds of Charity, alms). And Allah likes not disbelievers, sinners (Qur'ān, 2:275-276).

Allah, may He be exalted, has instructed us to be generous and compassionate to the debtor and extend time to the debtor who is facing hard times or difficulties, Allah, may He be exalted, says (interpretation of the meaning): "And if the debtor is in a hard time (has no money), then grant him time till it is easy for him to repay" (Qur'ān, 2:280). Moreover, it is recommended to waive the debt or part of it, as an act of charity, as Allah, may He be exalted, says (interpretation of the meaning), "But if you remit it by way of charity, that is better for you if you did but know" (Qur'ān, 2:280).

Abu'l-Yasar, may Allah be pleased with him, that the Messenger of Allah, may blessings and peace of Allah be upon him, said, "Whoever allows more time for a debtor who is in

difficulty or waives the debt, Allah will shade him with His shade." (*al Muslim*, Hadith No. 3014.)

Buraydah, may Allah be pleased with him, said, "I heard the Messenger of Allah, may blessings and peace of Allah be upon him, said, "Whoever gives more time to a debtor who is in difficulty will have (a reward) equivalent to giving that amount in charity for each day." Then I heard him say: "Whoever gives more time to a debtor who is in difficulty will have (a reward) equivalent to giving double that amount in charity for each day." I said: I heard you, O Messenger of Allah, saying that whoever gives more time to a debtor who is in difficulty will have (a reward) equivalent to giving that amount in charity for each day, then I heard you say whoever gives more time to a debtor who is in difficulty will have (a reward) equivalent to giving double that amount in charity for each day. He said, "For each day he will have (a reward) equal to giving that amount in charity before the time for repayment of the debt comes, then if the time for repayment of the debt comes and he gives him more time, for each day he will have (a reward) equivalent to giving double that amount in charity. (*Imam Ahmad*, Hadith No. 22537). The hadith was classified as saheeh by al-Albaani in *as-Saheehah* (86) and by the commentators on *al-Musnad* (ar-Risaalah edn)."

Extending time for repayment of the loan will help the debtor and the debtor will not be compelled to resort to dealing in interest because it is prohibited as well as it will lead to doom because there is a declaration of war from Allah and His Messenger for dealing in interest. In addition, if there is no such gesture of good will, as mentioned in above Hadith, the debtor will have no choice but to declare bankruptcy and all parties involved including the entire economy will suffer immensely and the economy will fall into recession, similar to the financial crisis in 2008.

From the above analysis, it is clear that QH is:

- an interest-free loan as Prophet Muhammad, may blessings and peace of Allah be upon him, returned the loan and blessed the lender.
- QH is not just interest free short-term loans, rather lending forever. Ibn Abi Hatim, may Allah be pleased with him, recorded that Abdullah bin Mas`ud, may Allah be pleased with him, said, "When this verse, "Who is he that will lend Allah goodly loan, then (Allah) will increase it manifold to his credit (in repaying)," was revealed, Abu Ad-Dahdah Al-Ansari said, "O Allah's Messenger! Does Allah ask us for a loan?" The Prophet said, Yes, O Abu Ad-Dahdah. He said, "Give me your hand, O Allah's Messenger," and the Prophet placed his hand in his hand. Abu Ad-Dahdah said, `Verily, I have given my garden as a loan to my Lord.' He had a garden that contained six hundred date trees; his wife and children were living in that garden too. Abu Ad-Dahdah went to his wife and called her, "Umm Ad-Dahdah!" She said, "Here I am." He said, `Leave the garden, because I have given it as a loan to my Lord, the Exalted and Most Honored." She said, "That is a successful trade, O Abu Ad-Dahdah!'She then transferred her goods and children. (*Imam al-Bayhaqi (n.d). Shu'ab al-Iman*, Hadith no. 3452).
- QH is loan to Allah, and therefore, it has the characteristics of "public goods" and CB, as a public institution will be the right venue to help all, poor, needy, wayfarer, displaced people, and everyone who may need loans and funding for financing business and economic activities. Once the vulnerable groups will receive the generous and sufficient QH funds, they will use such funds as capital for business, production, distribution or engage in any economic activities of their choice and professional Islamic Financial planners and Bankers from their own banks where

they have opened their accounts will guide them to financial success, self-sufficiency, as well as sustainable and honorable livelihood in the long run.

When QH is given without interest, investment spending will be maximum, multiplier effect will be optimum, the dynamic multiplier-accelerator effects will maximize the expansionary QH-based MP throughout the entire economy, and not just the rich section, and the positive linkage effects will propel the engine of economic growth both in the short run and in the long run.

This paper will explore how QH will be used as an effective tool of MP, and how CB can use QH to increase or decrease the money supply (MS), not only through the conventional channels but also through both conventional and unconventional channels so that its effects will encompass the entire economy, and not just to a rich section of upscale neighborhoods. It will also focus on increasing output, employment and maintaining price stability.

If CB plans to pursue EMP, it will announce to both the members of money market as well as to vulnerable groups who otherwise will neither have access to fair borrowing privileges nor will receive direct benefits from the expansionary MP of the CB.

In QH-based MP, MS is circulated not only to the affluent and rich class in the society who are directly and indirectly controlling financial systems and financial institutions and deriving all the benefits but to different vulnerable groups including poor, orphans, destitute, wayfarer, displaced people. Indeed, the needy, the poor and destitute class will get priority in receiving QH loans. Such focus of circulating MS to the poor and vulnerable groups is based on the instructions by the One who knows what is perfect and what is imperfect and differentiates right from wrong, the Almighty Allah, may He be exalted, said:

> What Allah has bestowed on His Messenger from the people of the townships,- belongs to Allah,- to His Messenger and to kindred and orphans, the needy and the wayfarer; in order that it may not (merely) make a circuit between the wealthy among you. So take what the Messenger assigns to you, and deny yourselves that which he withholds from you. And fear Allah; for Allah is strict in punishment (Qur'ān, 59:7).

This is exactly what Chulho and Ryu (2017) have discovered that the US MP has become ineffective because of the anomalous behaviors of the big banks and financial institutions. Indeed, the increase in US money supply mostly flow through the US financial sectors and big banks, and directly contribute to increase their profits and it does little to stimulate the real sectors of the economy by increasing investment spending. In QH-based MP, the channels of money supply are different, the channels are not through big banks rather the poor, the needy, the orphans, the destitute and wayfarer as mentioned above in Qur'ān, 59:7. In this way, the increase in money supply will stimulate the real sectors of the economy by increasing investment spending directly.

One may argue that MP is not charity distribution, rather maintaining the supply of money in balance with the economic activities into the economy. Therefore, any imbalance in MS and economic activities will create either recession or inflation. The answer to the above argument is clear in the following example: MS is similar to the blood supply in the body; if blood supply is prevented and denied to any parts of the body for whatever reasons, whether that part is more essential or less essential, that part of the body will be paralysed and the whole body will suffer and cease to function. Conventional interest-based MP has so far tried that the economy will function normally. Unfortunately, under interest-based MP, the economy has been functioning similar to the "paralyzed economy" because a significant part of the economy comprising poor, destitute, wayfarer, displaced people and the needy and all those who do not have sufficient collaterals for loan applications, were denied the loans and, therefore, MS was not flowing to them or the effect of MS did not reach them,

similar to the example of blood supply failing to reach those segment of the economy created "paralyzed" economy and thus failed to realize the potential real output that the economy can produce if the economy is not paralyzed. Therefore, the QH-based MP intends to reach out all the parts and segments of the economy, and even giving preferences to the poor, vulnerable and the needy. In such way, QH-based MP is expected to strengthen the weak parts of the economy and bringing them at par with the stronger parts of the economy. As a result, the entire economy will be stronger than ever and through the multiplier–accelerator effects, the entire economy will get only stronger and better day by day under QH-based MP.

QH-based MP encourages QH as goodly loans, and it is interest free and such loans will create the maximum possible effects on aggregate expenditures (AE) by shifting AE line upward and as a result both output (Y) and employment (E) will increase and unemployment rate (UR) will fall. Fall in UR will reduce misery index. In addition, as Y will increase supply of goods and services in the economy will increase. As there is no borrowing cost embedded in QH-based MP, it will cause the aggregate supply (AS) curve to shift to the right and given the aggregate demand (AD) curve in the economy, the price level will fall and output will increase. Therefore, fall in UR and fall in price level will reduce misery index further. No wonder QH is praised so highly and encouraged so much and its effects and rewards will be multiplied so many times as mentioned in both Quran and Hadith.

In this paper, QH will be used instead of conventional bank rate and other interest-based tools of MP, and the relative effectiveness will be examined on the basis of eventual effects of QH-based MP on major macroeconomic variables purely on theoretical basis. QH is one of the most important Islamic and *Sharia-compliant* modes of financing for resource mobilization and thus provide funds for investment and consumption spending. However, in current Islamic Banking system, the role of QH is still at incubatory or minimal stage and not widely used because this mode of financing is much more driven by encouraging public good aspect rather than the motive of making quick profits. Therefore, QH as a tool of MP will be one of the best suited fields where it can maximize its intended positive benefits because the purpose of MP is much more towards maximizing the benefits for the entire economy, mostly similar to public goods compared to profit driven motives of profit maximization for private enterprises. If the nations plan to conduct MP with positive high interest rates, there will be market failures and optimum resource allocation will be interrupted and the economy will function like paralyzed economy. So it is the choice of the nations of the world and of course, there are trade-offs.

This paper is divided as follows: Section 2 briefly reviews the literature on the effectiveness of conventional MP as well as QH and *Sharia*-compliant MP in general. A theoretical model is developed in Section 3. Section 4 analyzes the QH-based MP model, computes different parameters and explains transmission mechanisms as well as findings. Section 5 addresses the limitations of this study. Section 6 summarizes concluding remarks.

2. Literature review

The current interest-based conventional MP is mostly ineffective (Chulho and Ryu, 2017). Even with the expansionary MP when CB cuts bank rate, it only contributes to further increase in profits for the big banks and financial institutions. Those who are poor and destitute, they belong to "collateral-less" cohort of population and, therefore, no matter how low is the borrowing rate, they have no access or share in the increase in money supply because without collaterals, they will not qualify for loans. Their access to financial capital and expansionary MP will be denied. Goodhart (2015) argued that MP became comparatively ineffective. According to Goodhart (2015), even when CBs cut bank rates, bank lending to private sector as well as broad money supply into the economy have

stagnated, and it hardly stimulates any recovery. This is obvious because a significant part of the economy belonging to "collateral-less" cohort of population are deprived in conventional interest based MP. Furthermore, with each recession and financial crisis, the size of such cohort of "collateral-less" segment of population will keep on increasing and only QH-based MP can address this issue by resuming the flow of money supply through this important and neglected segment of the economy. Indeed, QH-based MP will not only be effective but also benefit all the segments of the economy and bring full employment and will make the economy stronger, and vibrant than ever. Mishkin (2009) argued that despite the cuts in federal funds rate or CB interest rate from 5.25 per cent in September 2007 to 0 to 0.25 per cent in December 2008, the cost of credit to both households and businesses has virtually increased. Furthermore, interest rates on riskier debt has increased substantially and thus makes MP less effective. Acharya *et al.* (2011) found that bank liquidity is counter cyclical, and it is extremely low during economic booms but excessively and substantially higher during crises and thus makes MP ineffective because if banks hold enormous amount of liquidity during recession because of the fear of loan losses, not only the recession will prolong but also the recovery will be very difficult. Acharya *et al.* (2011) had shown that weekly cash holdings of US commercial banks, especially the cash to total assets sharply increased since September 4, 2008 and thus coincided with the recession. Instead, in fact, the opposite should have happened for effective MP. Nobel Laureate Robert Mundell (1963, 1960) contributed extensively on interest-based MP and its ineffectiveness under the existence of free movement of capital and stable exchange rate. According to famous Mundell–Fleming model (1963, 1962, 1960), MP will be ineffective under the assumption of free capital mobility and stable exchange rate. For example, if a country plans to pursue tight MP and thus raises CB interest rate, its currency will appreciate, and there will be inflow of capital. Exactly such incident happened in 1981 when the USA unilaterally increased federal funds or CB interest rates, US dollar started to appreciate and there was inflow of funds from all over the world into the US economy. To stop capital flow into the USA, all the developed capitalist countries as well as others immediately raised their CB interest rates, and the result was gloomy world-wide recession. Now suppose, in Mundell-Fleming model, a country plans to pursue expansionary MP and thus lowers its bank rate or CB interest rate. Immediately, its currency will depreciate and there will be massive capital outflow from this country to outside world and soon the country may abandon such expansionary MP. Therefore, according to Mundell–Fleming model, a country cannot have an independent MP when it plans for stable exchange rate and free movement of capital. In QH-based MP, CB lends to the poor cohort of population and all the money is expected to spend in producing goods and services in domestic economy and thus increase in money supply through QH-based MP to the poor will not affect the flow of funds, neither the exchange rates as it does in case of changing CB interest rates. Similarly, when the CB collects funds from the poor gradually as part of tight MP, it will neither trigger inflow or out flow of funds nor appreciation or depreciation of currency and thus not hurting exports or increasing imports or trade deficits. It appears that interest rate is one of the most destabilizing factor which has been causing instability as well as ineffectiveness in interest-based conventional MP. In QH-based MP, such instability and ineffectiveness do not exist.

According to the neoclassical policy-ineffectiveness proposition (PIP), based on the theory of rational expectations, Sargent and Neil (1976) argued that "monetary policy cannot systematically manage the levels of output and employment in the economy." According to this argument, if the CB pursues expansionary MP, the money supply of the economy will increase and the agents can easily foresee such action and anticipate the upcoming effects of such increase in money supply and, therefore, they will revise their wage and price

expectations upward, the real wage will remain the same and the real GDP and employment will not change. The agents do not have any money illusion. Therefore, MP will fail to increase output and employment in the economy and thus MP will be ineffective. In new classical economic theory, long run aggregate supply curve is vertical, while in QH-based MP, the poor cohort of population receives QH funds for investment spending and they will use the funds for generating economic activities and thus for earning income and creating employment, and the ventures could be any production of goods and services in the economy which will lead to the expansion of the size of the real sector of the economy. Such production of goods and services could be any small, medium or even large-scale production facilities where goods and services will be produced. Such poor cohort of population receives QH funds under the contract that the funds will be used for investment spending for certain projects and, therefore, they will invest and spend such QH funds immediately and, therefore, not to think of forming rational expectations as it happens in new classical economic theory. The new classical economists are wrong when they assume that the economy is in full employment despite the existence of discouraged workers who have been looking for work for years and could not find jobs and eventually gave up looking for jobs. These people are, in essence, unemployed, poor, desperate and QH funds are allocated mostly for them so that they can again participate in economic activities. Leijonhufvud (1968) argued that "Keynesian Revolution" was all about the effectiveness of fiscal policy and "withering away of interest in monetary policy." Therefore, according to Keynesian revolution, the MP will not work, only fiscal policy is effective, and it will work. Keynes (1936) argued that expansionary MP can create liquidity trap and he wrote:

> There is the possibility that, after the rate of interest has fallen to a certain level, liquidity-preference may become virtually absolute in the sense that almost everyone prefers cash to holding a debt which yields so low a rate of interest. In this event the monetary authority would have lost effective control over the rate of interest.

Here, Keynes is wrong because he considers "rate of interest" is the only tool of MP. In our current study, QH is a unique and effective tool of MP. In this QH-based model, expansionary MP will rather put the money outside banks and away from the so called "liquidity trap" because QH-based MP empowers the poor cohort of population over big banks. The poor cohort of population will devote all QH funds for generating economic activities and for creating output and employment and, therefore, it will break the nexus of liquidity trap and will use the funds for investment spending outside banks and outside liquidity trap.

So far, in the literature, both in conventional and *Sharia-compliant* system, there is no full-fledged and direct application of QH model as a tool of MP except Chapra (1996) proposed that the newly created money by CB (seigniorage) should be used for budget deficit financing through QH (interest-free loans). In this way, MP is mixed with fiscal policy. There is no need for such mixing MP with fiscal policy because each policy can be pursued independently and effectively.

CB can control money supply by QH ratio where a certain percentage of demand deposits of the commercial banks should be allocated for interest-free loans (Arrif, 1996) but if only a small percentage of demand deposits are given as interest-free loans, it will have very minor effects in the economy. In our current model, it is the CB which will lend to all agents, poor or rich on QH basis nationwide and not just to the rich banks only.

Except the above, all the remaining literatures are related to non-QH-based other forms of Islamic or *Sharia-compliant* MP. Awad (2015) has surveyed almost all the literatures related to Islamic compliant MP, including the practical applications of all such tools of MP

by the CB of Sudan (CBS). Awad (2015) argues that profit-sharing ratio can be used as a tool of Islamic compliant MP.

QH is one of the many other *Sharia-compliant* tools of MP. For example, Selim (2013a) has proposed *Mudarabah* based MP which can be anti-recessionary as well. In addition, Selim (2013b) has demonstrated that *Mudaraba* based MP is more effective in increasing output, employment and maintaining price stability compared to conventional interest-based MP. Selim (2015) has also demonstrated that *Sukuk* can be used as effective tools of MP. Furthermore, Selim (2015) showed that MP based on buying and selling *Sukuk* in open market operations is relatively more effective than conventional interest based MP. Therefore, QH-based MP can be applied along with other *Sharia-compliant* modes of financing including profit-based models.

The other pioneers in the field of Islamic-compliant MP include Siddiqi (1982) and Chapra (1982). In addition, Kahf (1982) and Khan and Mirakhor (1989) also contributed in this field. Many of the above experts suggested open market operations for the securities with variable rates of return to be bought and sold for changing money supply. However, the variability in the rates of return may not necessarily make the securities legitimate or halal from Islamic perspective if they are directly or indirectly linked to LIBOR or other forms of interest rates. Khan and Mirakhor (1989) analyses the MP transmission mechanism in Islamic Economic system by using the modified version of IS-LM model but IS-LM model is based on interest rate system directly or indirectly and, as such, it cannot be used for Islamic MP. According to Bindseil (2004), the overall strategy for MP changed dramatically in recent years. In conventional interest-based system, MP has become less and less effective (Chulho and Ryu, 2017; Goodhart, 2015).

CB should seriously focus on Islamic modes of financing as alternative channel for MP transmission (Majid and Hasin, 2014) because only interest based bank rates will not include all banks and financial institutions. Bank deposits and loans are important and play quite significant role in MP transmission (Kassim and Majid, 2009). Omar and Meera (2010) suggested arbitrage pricing theory as an alternative to interest rate but did not elaborate such instrument for MP transmission. Husin (2013) attempted to use profit rate for MP transmission but also uses overnight policy rates, conventional interbank rates and Islamic interbank rates. As all the above three rates are linked (Husin, 2013) and therefore, short-term interest rate is blended in it and cannot be used for Islamic MP. When Islamic banks finance according to the *Sharia-compliant* modes of financing, MP transmission will often lead to growth of real sector by increasing the production of goods and services (Farahani and Dastan, 2013 and Majid and Hasin, 2014).

Currently, most IBs concentrate on *Murabahah* instead of *Musharakah* and *Mudarabah* because such institutions are risk averse (Ben Jedidia and Hamza, 2014, and Kayed, 2012) and, as a result, the full potential and the proper development of manufacturing sector often becomes difficult.

Our current QH-based MP is based on Islamic ethical and moral principles and as such, it is capable to overcome financial crisis through compassion and deferring the repayment schedules, while the conventional interest-based system is often rigid. For greater success, it is important for any system to incorporate compassion, flexibility and Islamic universal ethical principles (Adebayo and Kabir, 2013) in business practices.

Fahmy (2006) and Al-Jarhy (1981) came up with similar opinion but alternative to Chapra (1996), where CB can use "deposits certificates" in open market operations for controlling the money supply.

Ismal (2011) suggested two types of asset-backed securities which CB can use as tools of MP. These are:

(1) Wakalah wa Ijarah certificate (agency and leasing); and

(2) Wakalah wa Ijarah Muntahia Bitamlik certificates (agency and leasing-sale).

In both cases, CB receives a pre-determined amount as rent in Type 1, and rent plus part of the capital in Type 2. CB can buy and sell in open market operations and thus can change the supply of money at any time.

Bidabad *et al.* (2011) proposed interest-free bonds, or Sukuk as tools of MP. CB can buy and sell such Sukuk in the open market operation and, therefore, can change the supply of money.

During 1979-1989, there was dual banking system in Sudan and during 1990s, Sudan moved toward the Islamization process of banking sector (Central Bank of Sudan, 2006; Hussen, 2010). Shariah Supervisory Board was formed in 1992. CBS applied almost all the tools of Islamic-compliant MP. However, because of the turmoil in the South Sudan and certain instability, the net outcome of Islamic compliant MP is inconclusive. It will take time to truly determine the final outcomes of Islamization of CBS on its economy.

Khatat (2016) outlined certain difficulties, heterogeneity and complexities in applying MP in dual financial systems where both Islamic banks (IBs) and conventional interest-based financial system exist side by side. This paper attempts to overcome those problems by pursuing QH-based MP for all financial institutions, Islamic and conventional, and there will be no complexities whatsoever and all financial institutions, Islamic and conventional will have equal access to funds as well as the lender of last resort services of the CB, and all banks will be treated equally and fairly.

This paper focuses on how CB can use QH as a tool of MP. The model examines the transmission mechanism of QH as a tool of MP and the transmission mechanisms not only follows from CB to banks and financial institutions but also toward the poor, the destitute, needy, wayfarer and other vulnerable groups in the economy.

3. The model

Now suppose CB plans to pursue expansionary MP by applying the tool of QH. CB cannot lend directly to the people and as such can issue QH papers similar to Treasury Bills except for the transaction of QH papers, there will be no payments or receipts of interest for lending and borrowing rather borrowing and lending will be interest free and purely for the love as well as for seeking rewards from Allah, may He be exalted.

Therefore, CB will prepare and produce, say BD10 Billion Dinar worth of QH Papers or cheques, say QHP and will distribute among the deserving cohort of population. The CB will use QH as an important tool of MP. CB will identify the poor cohort of population or more specifically, identify the people under poverty line and determine the requirements of funds per person.

3.1 Impact of QH-based MP on the poor cohort of population

Funds per person should be sufficient enough, so that he or she may be able to break the shackles of poverty. Suppose, the experts have estimated that an initial endowment of BD100,000 will help an individual to rise up above the poverty line. An Islamic Finance/Banker specialist will help him or her to guide for using such funds in such a way that the person will not only fulfil his current requirements for basic needs such as food, shelter, clothing, health care and education but will also work out a plan so that he or she will generate a continuous cash flow through a *Halal* business or venture in such a way that he or she will be self-sufficient in the long run and at the same time, will be able to pay off the

initial QH amount of BD100,000 by generous and flexible installment plan without any interest or service fees whatsoever.

For convenience, such papers can be issued as BD1000 denominations. Anyone who will receive such papers or cheques will take them to any bank and that bank, on behalf of the CB will open an account for this client and deposit the QH cheques. This bank will eventually collect such funds from the CB.

3.2 Impact of QH-based MP on the macroeconomic equilibrium

Let us introduce aggregate expenditure-aggregate output (AE-AO) model and examine all such chain effects of EMP by usings QH. Aggregate or total expenditures (AE) of the economy can be defined as the sum of consumption expenditures (C), Gross Investment spending (Ig), Government spending (G) and Exports (X) less Imports (M) or net exports (Xn = X − M) and can be written as follows:

$$AE = C + Ig + G + X - M \tag{1}$$

Now in the above equation:

$$C = Ca + bYd; \quad Yd = Y - Z; \quad Z = zY \tag{2}$$

$$Ig = \mathrm{I}a - rR + \alpha QH + hY \qquad r < 0; \quad \alpha > 0;$$

$$h > 0 \tag{3}$$

$$G = \mathrm{G}a + \mu Y; \quad \mu > 0 \tag{4}$$

$$X = \mathrm{X}a + xY \qquad x > 0 \tag{5}$$

$$M = \mathrm{M}a + mY - nY \qquad m > 0; \; n < 0 \tag{6}$$

In above, C_a = Autonomous Consumption; b = Marginal Propensity to Consume; Y_d = Disposable Income, Y = Aggregate Output or Income; Z = Zakat; z = Marginal Propensity to Zakat or Zakat rate; C = Consumption Expenditures; Ig = Gross Investment spending, Ia = Autonomous Investment spending, R = Rate of interest, α = Change in investment spending resulting from the change in QH, and $\alpha > 0$, h = Marginal propensity to invest, G = Government spending, Ga = Autonomous government spending, μ = marginal propensity to Government spending, X = Exports, Xa = Autonomous exports, x = Marginal propensity to exports, M = Imports, M_a = Autonomous Imports; m = Marginal Propensity to Import, n = marginal propensity to import substitution.

The economy will be in equilibrium when:

$$Y = AE \tag{7}$$

$$where \;\; AE = C + Ig + G + X - M \tag{8}$$

Now substituting the values from equations (3)-(6) in , yields:

$$Y = Ca + bY - bzY + Ia - rR + \alpha QH + hY + Ga + \mu Y + Xa + xY - Ma - mY + nY \quad (9)$$

$$Y(1 - b + bz - h - \mu - x + m - n) = Ca + Ia - rR + \alpha QH + Ga + Xa - Ma \quad (10)$$

$$or,\ Y = \frac{1}{(1 - b + bz - h - \mu - x + m - n)} x\,[Ca + Ia - rR + \alpha QH + Ga + Xa - Ma] \quad (11)$$

$$or,\ Y = \varphi(Ca + Ia - rR + \alpha QH + Ga + Xa - Ma) \quad (12)$$

$$or, \quad Y = \varphi A \quad (13)$$

$$where\ \varphi = \frac{1}{1 + bz + m - b - h - \mu - x - n}$$

$$\varphi = \frac{1}{1 + bz + m - (b + h + \mu + x + n)} \quad and \quad (14)$$

$$A = Ca + Ia - rR + \alpha QH + Ga + Xa - Ma \quad (15)$$

Equation (13) indicates the macroeconomic equilibrium. Now we will examine how QH based MP will impact on real GDP, employment, price stability, supply side and the flow of funds.

4. Analysis of QH-based MP model, transmission mechanism and findings

Equations (12) and (13) determine the macroeconomic equilibrium with QH where taxes are replaced with Zakat in consumption function in equation (2). In investment spending function, in equation (3), there is autonomous investment such as Ia. In addition, Investment spending is positively influenced by QH in equation (3) and its impact on Ig is shown in the following equation:

$$\frac{\partial Ig}{\partial QH} = \alpha > 0 \quad (16)$$

In above equation (16), the higher the QH, the higher will be the Ig or gross investment spending by the factor α, and it will positively influence the investment spending in the economy. QH will not only influence Ig but also positively influence the equilibrium income, Y. The positive impact of QH on equilibrium income, Y will be much more robust and stronger because of the positive simultaneous effects of both multiplier and accelerator. To explain this phenomenon, consider equations (12) as follows:

$$Y = \varphi(Ca + Ia - rR + \alpha QH + Ga + Xa - Ma)$$

$$or,\ Y = \varphi Ca + \varphi Ia\ - \varphi rR + \varphi \alpha QH$$

$$+\varphi Ga + \varphi Xa - \varphi Ma \tag{17}$$

Equilibrium income is positively and much more vigorously influenced by QH-based MP. QH has the potential to increase investment spending by lowering the cost of borrowing across the economy, and increase in investment spending is the driving force for increasing output, employment and income. Increase in employment will not only reduce unemployment rate but also cause a rightward shift in aggregate demand curve which will eventually increase equilibrium income further and the economy will be in the expansion or recovery stage of business cycle, and more jobs will be created.

The impact of QH on Y is shown in the following equation (18) by partially differentiating equation (17) with respect to QH:

$$\frac{\partial Y}{\partial QH} = \varphi \alpha > 0 \tag{18}$$

In above equation (18), the impact of QH on Y is positively related which implies that increasing QH will increase real GDP in the economy by the multiple of $\varphi \alpha$. Furthermore, increase in Y will be equal to:

$$\partial Y = \varphi \alpha (\partial QH) \tag{19}$$

And additional increase in investment spending will be equal to:

$$\partial Ig = \alpha (\partial QH) \tag{20}$$

In addition, the increase in QH will increase Investment spending; Ig and increase in Ig will increase Y further through multiplier-accelerator effects. To show such effects recall the Investment spending function, equation (3) as follows:

$$Ig = Ia - rR + \alpha QH + hY$$

Now increase in QH increases Ig and increase in Ig increases Y and an increase in Y further increases Ig as shown below by partially differentiating Ig with respect to Y as follows:

$$\frac{\partial Ig}{\partial Y} = h > 0 \tag{21}$$

Therefore, change in investment spending will be equal to change in Y times h:

$$\partial Ig = h(\partial Y) \tag{22}$$

Furthermore, an increase in QH will increase Y and an increase in Y will increase exportable surplus and as a result, export will increase at a greater rate. This effect can be analyzed by partially differentiating the export function as follows:

$$X = Xa + xY$$

$$\frac{\partial X}{\partial Y} = x > 0 \tag{23}$$

As Y increases, X will increase and Y will increase partly because of the increase in QH. Therefore, increase in QH will propel export growth as well.

Finally, the focus of increase in QH is expected to concentrate on import substitution. As a result, when real GDP, Y, increases, M may decrease because domestic output will replace imports. This effect can be examined by partially differentiating the import function as follows:

$$M = Ma + (m - n)Y$$

$$\frac{\partial M}{\partial Y} = m - n < 0 \quad if\ n > m \tag{24}$$

Likewise, the increase in QH will also affect the slope of the AE line. The higher the QH, the higher will be the value of b, h, μ, x, n and higher will be the slope of AE line and higher will be the value of multiplier, and therefore, the higher will be real GDP, Y, and eventually unemployment rate will fall. The above relationships are shown in the following Table I.

In QH model, if interest rate is zero, and if there are no income taxes or autonomous taxes, the multiplier effect will be the highest and the value of the multiplier can range from 3.2 to 8.08. Such expansionary MP effects are summed up in Theorem 1 below:

Theorem 1: In QH model, if R = 0, $rR = 0$ and $Ig > Ig^*$. In addition, $A > A^*$ and AE line shifts up and $Y > Y^*$, $E > E^*$ and $U < U^*$.

Now suppose the CB follows QH based MP but the financial institutions charge positive

Value Of b	Value of h	Value of μ	Value of x	Value of n	Effects of QH on AE*	Value of 1 + bz + m	Slope of AE**	Multiplier φ***
0.5	0.1	0.1	0.1	0.1	0.90	1.2125	0.3125	3.20
0.5	0.11	0.1	0.1	0.1	0.91	1.2125	0.3015	3.32
0.5	0.11	0.11	0.1	0.1	0.92	1.2125	0.2925	3.42
0.5	0.11	0.11	0.11	0.1	0.93	1.2125	0.2825	3.54
0.5	0.11	0.11	0.11	0.11	0.94	1.2125	0.2725	3.67
0.55	0.11	0.11	0.11	0.11	0.99	1.21375	0.22375	4.47
0.55	0.11	0.11	0.11	0.11	0.99	1.11375	0.12375	8.08

Notes: QH-based expansionary MP will positively influence Y and as Y increases, it will induce further growth in the economy and as a result, the value of the parameters, b, h, μ, x, and n will tend to increase and the slope of AE will be steeper and as a result, the value of the multiplier will increase. Furthermore, import substitutions will likely to lower the value of m if quality and customs made products are produced in domestic economy, consumers' tastes and preferences may shift in favor of home grown products and as a result m may fall to 0.1 from the initial value of 0.2 and as a result 1 + bz + m = 1.11375 and the slope of AE will be 0.12375 and the value of the multiplier may reach as high as 8.08; *$(b + h + \mu + x + n)$; **$1 + bz + m - (b + h + \mu + x + n)$; *** $\varphi = \frac{1}{1+bz+m-(b+h+\mu+x+n)}$

Table I. Computation of the slope of aggregate expenditure line, and the value of multiplier in QH model when R = 0; $t = 0$; z = 2.5 %, initial values of b = 0.5, h = 0.1, μ = 0.1, x = 0.1, n = 0.1 and m = 0.2

interest rates, or there are both Islamic Banks and conventional interest-based banks. Conventional interest-based banks charge positive interest rates, i.e. R > 0 and therefore, rR > 0. In this case, the expansionary MP results shown above will be reduced and the impact of QH on output and employment will be less as shown by the following theorem.

Theorem 2: In QH model, if R > 0 → $rR > 0$ and in equation (13) above, $Y = \varphi A$, new A, say A^* will be less than A. Therefore, if $R > 0$, → $rR > 0$, $A^* < A$ and $Y^* < Y$ because $\varphi A^* < \varphi A$.

Now suppose the consumption function changes from equation (2) to (2.1) where in Equation (2.1), there are income taxes, and tax function (T) is given as, $T = To + tY$ where income tax rate (t) is positive and autonomous tax (To) is also positive.

$$C = Ca + bYd;\ \ Yd = Y - Z;\ \ \ Z = zY \tag{2}$$

$$C = Ca + bYd;\ \ Yd = Y - Z - T;\ \ \ Z = zY;\ \ \ T = To + tY \tag{2.1}$$

As a result, the value of multiplier φ will decrease because new φ^* will be less than φ because $t > 0$ as shown below:

$$\varphi^* = \frac{1}{1 + bz + m + t - b - h - \mu - x - n}$$

In addition, new A, say A** will be less than A* because of the introduction of taxes, and autonomous taxes which will reduce autonomous expenditures as shown below:

$$A^{**} = Ca + Ia - rR - To + \alpha QH + Ga + Xa - Ma$$

Therefore, even if CB follows QH-based MP and if R > 0 and $rR > 0$, $t > 0$ and To > 0, the total effect of QH-based MP on Y, E and UR will be even less as proved in Theorem 3 as follows:

Theorem 3: In QH model, if R > 0 → $rR > 0$ and in equation (13) above, $Y = \varphi A$, A** will be less than A* when To > 0 and $\varphi^{**} < .\varphi^* \rightarrow t > 0$. Therefore, if R > 0,→ rR > 0, $t > 0$ and To > 0, then $A^{**} <$ A* and $Y^{**} <$ Y* because $\varphi^{**}A^{**} < \varphi^*A^* \rightarrow E^{**} < E^*$ and U** > U*.

Often excessive taxes on the people is tantamount to devour the wealth of others and, therefore, in Islamic compliant economy, there will be zakat but excessive taxes and imposing income taxes again on top of the zakat will be considered double taxation. Appropriation of wealth of others is prohibited in Islamic compliant economy as mentioned in Quran: "And do no devour the wealth of others in wrong way" (Qur'ān, 2:188). No wonder, excessive taxes and income taxes reduce the value of the multiplier as well as autonomous expenditures and eventually reduce real GDP, employment and increases unemployment as shown in Theorem 3 above.

In Islamic economic system, *riba* is prohibited and borrowing and lending in Islamic economic system can be performed by the *Shariah-compliant* modes of financing such as *Murabaha, Mudarabah, Musharaka, Bai-As-Salam, Istisna, Sukuk and Qard-al Hasan*. If *riba* is prohibited, and if QH, or any one, or all of the *Shariah-compliant* modes of financing are followed, then R = 0 and $rR = 0$, and Investment spending (Ig) will be higher and autonomous spending (A) will be higher, and as a result, income (Y) and employment (E) will be higher and unemployment (UR) will fall further.

4.1 Impact of QH-based MP on central bank and financial institutions

Let us examine the transmission mechanism and effectiveness of expansionary MP when QH is applied as a tool of MP, instead of bank rate. In QH-based expansionary MP, say QHEMP, CB will increase money supply by increasing QH into the economy. In Equation (13), when the CB plans to follow QH-based MP and issues BD10bn QH funds and individual cheques will be delivered to the selected set of agents, each agent will deposit such QH cheque to a member of financial Institutions as mentioned above. The money supply in the economy will increase. As QH funds will be deposited into the clients' account, the demand deposit of the banks will increase. If the CB fixes the required reserve ratio (δ) as 5 per cent, then the money multiplier(γ) of the economy will be as follows:

$$\gamma = \frac{1}{\delta} = \frac{1}{0.05} = 20 \tag{25}$$

Total credit creation or loan expansion (LE) into the economy for increasing aggregate expenditures including investment spending can be calculated for the deposit at the beginning (DB) amount of BD10bn QH as follows:

$$LE = (\gamma)(DB) = 20x\,10 = BD200\,billion \tag{26}$$

As investment spending and consumption spending will increase, aggregate demand (AD) curve of the economy will shift to the right, real GDP (Y) will increase, employment (E) will increase and unemployment rate (UR) will fall. In aggregate expenditure model, increase in Ig as well as C will shift the AE line up and equilibrium income(Y) will increase. Obviously, increase in Y will lead to increase in E and unemployment rate will fall. Now the question is how much Y will increase when QH will be increased to BD10? The answer can be found by calculating equilibrium income and multiplier, from equation (13), as follows:

$$Y = \varphi A$$

$$or,\ \Delta Y = \varphi \Delta A$$

$$or,\ \Delta Y = \varphi(10) \tag{27}$$

$$where\ \ \Delta A = BD10\,billion$$

Now from Table I, the value of the multiplier, φ, in QH model when rate of interest is zero (R = 0) and income tax rate is also zero (t = 0) can range between 3.2 and 8.08. If $\varphi = 3.2$, then equilibrium income will increase an additional amount of:

$$\Delta Y = \varphi(10) = 3.2\,x10 = 32\,billion\,BD \tag{28}$$

However, if from Table I, the value of the multiplier, φ, in QH model when rate of interest is zero (R = 0) and income tax rate is also zero (t = 0) can also reach to $\varphi = 8.08$, and in that case, the equilibrium income will increase an additional amount of:

$$\Delta Y = \varphi(10) = 8.08\,x10$$

$$or,\ \Delta Y = 80.80\,billion\,BD \tag{29}$$

In above example, change in autonomous expenditures is assumed $\Delta A = BD10$bn but when this BD10bn will increase the demand deposit of the entire financial systems, and all banks will follow the common rule of CB that the $\delta = 5$ per cent, the deposit in the beginning of BD10bn can create the loan expansion or loan creation up to BD200bn as shown in equation (26). Therefore, the QH model can multiply the real GDP even higher and employment will increase further and unemployment rate will continue to fall. Increase in real GDP will eliminate shortages into the economy and price stability will be maintained as the economy continues to grow and such relationship is explained in the following Theorem 4 where m = money supply, v = velocity of money, p = price level, y = real GDP.

Theorem 4: If $mv = py \rightarrow \Delta mv = \Delta py \rightarrow \Delta mv = \Delta yp \rightarrow P = \frac{\Delta mv}{\Delta y}$. If $\Delta y > \Delta mv \rightarrow$ P↓.

As the above theorem postulates that as long as change in output outstrips the change in MS, price level will not rise rather fall.

Now the transmission mechanism of QH-based MP can be summarized as follows:

$$\uparrow QH \rightarrow DD \uparrow\rightarrow LE \uparrow\rightarrow MS \uparrow\rightarrow (Ig, C) \uparrow\rightarrow AD \gg Right \rightarrow (Y, E) \uparrow\rightarrow U \downarrow \tag{30}$$

Equation (30) explains the transmission mechanism of QH-based MP. As the CB increases QH, the demand deposits (DD) of the financial institutions will increase, loan expansion (LE) in the economy will increase, and as a result, money supply (MS) in the economy will increase, gross investment spending (Ig) and consumption expenditures (C) in the economy will increase and aggregate demand (AD) curve will shift to the right. When AD shifts to the right, both real GDP(Y) and employment (E) will increase and unemployment rate (U) will fall.

4.2 Transmission mechanism of QH-based MP on exports (X)

As real GDP (Y) will continue to increase exportable surplus (Xs) will also increase, and exports (X) will increase. As exports (X) will increase, foreign currency reserves (FCRS) with the CB will increase, and as a result, money supply (MS) will increase and AD will shift to the right. Rightward shift in AD will increase both real GDP(Y) and employment (E) again and will reduce unemployment rate (U) further and such effects are shown below:

$$\uparrow Y \rightarrow Xs \uparrow\rightarrow X \uparrow\rightarrow FCRS \uparrow\rightarrow MS \uparrow\rightarrow AD \gg Right \rightarrow (Y, E) \uparrow\rightarrow U \downarrow \tag{31}$$

Equation (31) clearly portrays that QH based MP will increase exportable surplus and exports and thus FCRS with CB will increase and, as a result, MS will increase and Y and E will increase further and UR will fall and thus will make QH-based MP more effective.

4.3 Transmission mechanism of QH-based MP on import substitutions and imports

As real GDP (Y) increases because of QHEMP, the increase in Y will also include the production of import substitutes (IMs) and as a result, imports (M) will fall, net exports (Xn) will increase. Increase in net exports resulting from the fall in imports and increase in the production of import substitute products which are now produced in the domestic economy, and as a result, FCRS with the CB will increase. Increase in FCRS with CB will cause an

increase in the money supply (MS) and AD curve will shift to the right further and both Y and employment (E) will increase and unemployment rate will fall. The transmission mechanism of QH-based MP on imports and import substitutions are shown below:

$$\uparrow Y \rightarrow IMs \uparrow\rightarrow M \downarrow\rightarrow Xn \uparrow\rightarrow FCRS \uparrow\rightarrow MS \uparrow\rightarrow AD \gg Right \rightarrow (Y,E) \uparrow\rightarrow U \downarrow \tag{32}$$

Equation (32) clearly shows that QH-based MP will help to produce import substitutes. Increase in import substitutions will reduce imports and the reduction in imports will cause an increase in net exports. Increase in net exports, will of course, increase FCRS with CB and thus MS will increase and will make MP more effective and obviously, Y and E will increase and UR will fall further.

4.4 QH-based MP and supply side effects

The QH-based MP will cause a rightward shift in the aggregate supply (AS) because the borrowing cost in the entire economy, on average, will fall. A rightward shift in AS curve will result in further increase in Y and fall in price level (P) and such transmission mechanism effects are shown below:

$$\uparrow QH \rightarrow Cost\ of\ borrowing \downarrow\rightarrow AS \gg Right \rightarrow (Y,E) \uparrow\rightarrow (P,\ U) \downarrow \tag{33}$$

Equation (33) shows how the reduction in borrowing cost across the different sectors of the economy will trigger a rightward shift in AS curve, and as a result, Y and E will increase and P and U or misery index will decline and the Phillips curve will shift towards the origin.

4.5 QH-based MP and flow of funds (ff)

QH-based MP will create full employment in the economy, high growth rates of real GDP as well as price stability, and it is expected that the overall rates of return on investment will be higher in domestic economy compared to those economies where CB pursues relatively tight MP, and the overall pictures of output, unemployment and inflation are not satisfactory. Also high taxes and volatile exchange rates in many overseas countries may cause an inflow of funds in domestic economy. The transmission mechanism can be summarized as follows:

$$\uparrow QH \rightarrow (Y,E) \uparrow\rightarrow (P,\ U) \downarrow\rightarrow \dot{\pi} \uparrow \rightarrow ff \uparrow\rightarrow FCRS \uparrow$$

$$\rightarrow MS \uparrow\rightarrow AD \gg Right \rightarrow (Y,E) \uparrow\rightarrow U \downarrow \tag{34}$$

Equation (34) clearly indicates that the prosperity created by QH based MP in domestic economy will attract flow of funds from abroad. As a result, FCRS with the CB will increase and consequently, MS in the economy will increase and thus it will make QH-based MP even more effective.

4.6 Validity of QH-based MP and evidence from the Eurozone and OECD countries

One may question the feasibility and validity of QH-based MP. How is it possible that CB will lend at zero rate of interest? The answer is simple, there are many CBs from the developed capitalist countries, mainly Eurozone countries and some of the members of the OECD countries who have been pursuing interest free MP for a significant period. Table II shows that 23 countries in Group 1 pursued zero or negative bank rates or CB interest rates,

close to QH-based MP for an average period of about 1.26 years, and their performance on inflation rates are better than those countries where positive interest rate based conventional MP was followed. Inflation rates in Group 2 countries were 0.96 per cent higher compared to Group 1 countries.

These CBs of these countries started to lend to the commercial banks, and other financial institutions without charging any interest and many others even charge negative interest rates. If one assumes that QH is given without any interest, then we may consider such loans may be closest to QH or interest free loans (IFL). In the past, Central Bankers used to argue that expansionary MP will lead to inflation but today those arguments have been proved to

	Bank rates	Policy is in effect in years	Inflation Rates
Group 1: Countries			
Japan	−0.10	1.33	0.8
Switzerland	−0.75	1.33	−1.1
Sweden	−0.50	1.25	0.0
Denmark	−0.65	1.33	0.5
Germany	0.00	1.25	0.2
The Netherlands	0.00	1.25	0.6
Luxemburg	0.00	1.25	0.5
Austria	0.00	1.25	0.9
Belgium	0.00	1.25	0.6
Cyprus	0.00	1.25	−2.1
Estonia	0.00	1.25	−0.5
Finland	0.00	1.25	−0.2
France	0.00	1.25	0.0
Greece	0.00	1.25	−1.7
Ireland	0.00	1.25	−0.3
Italy	0.00	1.25	0.0
Latvia	0.00	1.25	0.2
Lithuania	0.00	1.25	−0.9
Malta	0.00	1.25	1.1
Spain	0.00	1.25	−0.5
Portugal	0.00	1.25	0.5
Slovakia	0.00	1.25	−0.3
Slovenia	0.00	1.25	−0.5
Average	−0.11	1.26	−0.09
Group 2: Countries with positive bank rates			
USA	1.00	1.25	0.1
UK	0.25	0.83	0.1
Canada	0.50	2.90	1.1
Norway	0.50	1.25	2.2
Australia	1.50	2.83	1.5
New Zealand	1.75	0.67	0.2
Average	0.92	1.62	0.87

Table II.
Zero and negative bank rates, close to QH-based MP and positive interest-based conventional MP and their relative effects on inflation rates

Sources: i) Global Interest Rate Monitor (GIRM). www.Centralbanknews.info. Retrieved July 13, 2017; ii) Central banks – summary of current interest rates. www.global-rates.com Retrieved July 13, 2017; iii) Federal Funds Rate, American Central Bank's interest rate. www.Global-Rates.com; iv) UK consumer price inflation, Office for National Statistics. Her Majesty's Government. Retrieved December 12, 2017; v) Also please see list of countries by CB interest rates from Wikipedia and list of countries by inflation rates from Wikipedia

be wrong. In Table II, countries in Group 1 pursue interest free lending or zero or negative bank rates, still their inflation rates, on average, are not higher compared to the Group 2 countries that pursue positive interest-based MP.

If the above Group I in which 23 countries can successfully follow close to QH-based MP and still maintains relatively low rates of inflation, then there should be no doubt that QH-based MP can really revitalize the economy and at the same time can maintain acceptable rates of inflation. However, if bank rate is zero, it is not necessarily QH-based MP for many reasons because CB may pursue interest free bank rate or even negative bank rate but the financial Institutions, may still charge positive interest rates and their rates can go as high as 28.8 per cent for Master Cards borrowing and higher rates for those who need the credit most but they do not qualify because of their poor credit scores. As a result, zero bank rates present an opportunity for the commercial banks to increase their profits. (Chulho and Ryu, 2017). For example, whenever bank rate falls, the profits of Canadian commercial banks just go higher and higher. Second, even if the bank rate is zero and if the channels of MP still remains the conventional big banks, financial institutions and not the poor, destitute, orphans and the needy, then such zero interest bank rate will not produce the maximum benefits. However, zero interest-based MP is still better than positive interest based tight MP.

5. Limitations of this study

QH-based MP is usually expansionary MP, and as such, it can be argued that there is a probability that QH-based MP may lead to higher inflation rate. However, in this study, it has been shown with real world data in Table II, that 23 countries in Group 1 have pursued zero or negative interest rate policy and their experiences mitigate such probability.

6. Conclusion

QH-based MP has the potential to restore full employment and price stability in the economy. If the spirit of QH-based MP is followed by CB by changing the channels of transmission from big banks to the poor cohort of population throughout the economy and all financial institutions follow such spirit spontaneously, the outcome of such expansionary QH-based MP will maximize potential output, employment and minimize inflation rates. However, if the CB follows interest-free bank rate but if many financial institutions follow positive interest rate or conventional interest-based banking practices, the outcome will be less than optimum compared to previous case. However, the outcome with zero bank rate by CB and positive interest rates for commercial banks will still be better than positive interest-based conventional MP where CB lends to the commercial banks at positive or even at higher bank rates and the commercial banks charges even higher interest rates to their clients resulting a tight MP and reducing output and employment and increasing unemployment rates. Therefore, QH-based MP is an effective tool for achieving full employment, realizing potential output and maintaining low unemployment rate and price stability.

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